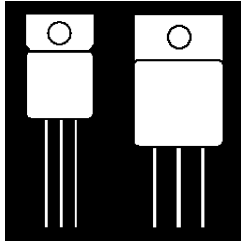


# LOW VOLTAGE, LOW $R_{DS(on)}$ POWER MOSFETS IN HERMETIC ISOLATED PACKAGE



**50V And 60V Ultra Low  $R_{DS(on)}$   
Power MOSFETs In TO-257 And TO-254  
Isolated Packages**

## FEATURES

- Isolated Hermetic Metal Packages
- Ultra Low  $R_{DS(on)}$
- Low Conductive Loss/Low Gate Charge
- Available Screened To MIL-S-19500, TX, TXV And S Levels
- Ceramic Feedthroughs Available

## DESCRIPTION

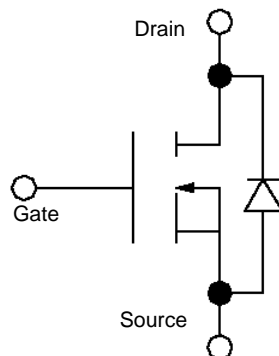
This series of hermetic packaged MOSFETs are ideally suited for low voltage applications; battery powered voltage power supplies, motor controls, dc to dc converters and synchronous rectification. The low conduction loss allows smaller heat sinking and the low gate charge simpler drive circuitry.

## MAXIMUM RATINGS (Per Device)

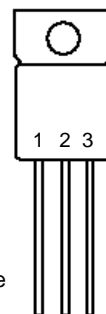
PART NO.	$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)	Package
OM60N06SA	60	.025	60	TO-254AA
OM50N06SA	60	.030	50	TO-254AA
OM50N06ST	60	.035	50	TO-257AA
OM60N05SA	50	.025	60	TO-254AA
OM50N05SA	50	.030	50	TO-254AA
OM50N05ST	50	.035	50	TO-257AA

3.1

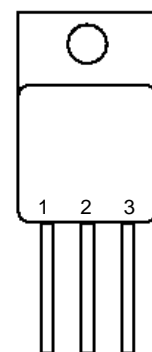
### SCHEMATIC



### T-3 PIN CONNECTION



### M-PAK PIN CONNECTION



## OM60N06SA - OM50N05ST

### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	60N06SA	50N06ST 50N05SA	60N05SA	50N05ST 50N05SA	Units
$V_{DS}$ Drain-Source Voltage	60	60	50	50	V
$V_{DGR}$ Drain-Gate Voltage ( $R_{GS} = 1\text{ M}\Omega$ )	60	60	50	50	V
$V_{GS}$ Gate-Source Voltage, Continuous	$\pm 20$	$\pm 20$	$\pm 20$	$\pm 20$	V
$I_D$ @ $T_C = 25^\circ\text{C}$ Continuous Drain Current <sup>2</sup>	55	50	55	50	A
$I_D$ @ $T_C = 100^\circ\text{C}$ Continuous Drain Current <sup>2</sup>	37	33	37	33	A
$I_{DM}$ Pulsed Drain Current <sup>1</sup>	220	200	220	200	A
$P_D$ @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	100	100	100	100	W
$P_D$ @ $T_C = 100^\circ\text{C}$ Maximum Power Dissipation	40	40	40	40	W
Junction-To-Case Linear Derating Factor <sup>1</sup>	.80	.80	.80	.80	W/ $^\circ\text{C}$
$T_J$ Operating and $T_{stg}$ Storage Temperature Range	-55 to 150	-55 to 150	-55 to 150	-55 to 150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	300	300	300	$^\circ\text{C}$

1 Pulse Test: Pulse width  $\leq 300\text{ }\mu\text{sec}$ . Duty Cycle  $\leq 1.5\%$ .

2 Package Limited SA  $I_D = 25\text{ A}$ , SC SC  $I_D = 35\text{ A}$  @  $25^\circ\text{C}$

### THERMAL RESISTANCE

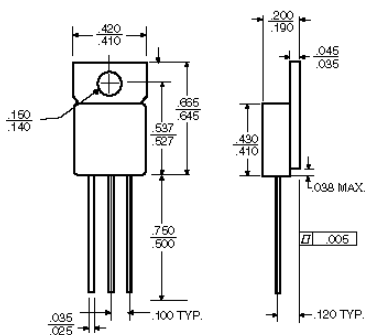
$R_{thJC}$ Junction-to-Case	1.25	$^\circ\text{C/W}$
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### PACKAGE LIMITATIONS

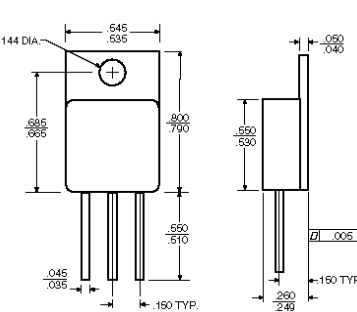
Parameters	TO254AA	TO-257AA	Unit
$I_D$ Continuous Drain Current	25	15	A
Linear Derating Factor, Junction-to-Ambient	.020	.015	W/ $^\circ\text{C}$
$R_{thJA}$ Thermal Resistance, Junction-to-Ambient (Free Air Operation)	50	65	$^\circ\text{C/W}$
Linear Derating, Junction-to-Case	0.8	0.8	W/ $^\circ\text{C}$

## 3.1

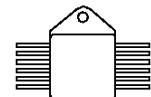
### T-3 MECHANICAL OUTLINE



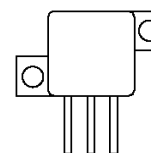
### M-PAK MECHANICAL OUTLINE



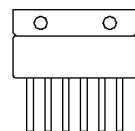
### PACKAGE OPTIONS



MOD PAK



Z-TAB



6 PIN SIP

#### Notes:

- Standard Products are supplied with glass feedthroughs. For ceramic feedthroughs, add the letter "C" to the part number. Example - OMXXXXCSA.
- MOSFETs are also available in Z-Pak, dual and quad pak styles. Please call the factory for more information.



**OM60N06SA** ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Avalanche Characteristics		Min.	Typ.	Max.	Units	Test Conditions
$I_{AR}$	Avalanche Current			55	A	(repetitive or non-repetitive, $T_J = 25^\circ\text{C}$ )
$E_{AS}$	Single Pulse Avalanche Energy			520	mJ	(starting $T_J = 25^\circ\text{C}$ , $I_B = I_{AS}$ , $V_{DS} = 25\text{ V}$ )
$E_{AR}$	Repetitive Avalanche Energy			130	mJ	(pulse width limited by $T_{Jmax}$ , $\delta < 1\%$ )
$I_{RR}$	Avalanche Current			34	A	(repetitive or non-repetitive, $T_J = 100^\circ\text{C}$ )
<b>Electrical Characteristics - OFF</b>						
$V_{DRSS}$	Drain-Source Breakdown Voltage	60			V	$I_B = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )			250 1000	$\mu\text{A}$	$V_{DS} = \text{Max. Rat.}$ $V_{DS} = \text{Max. Rat.} \times 0.8$ , $T_C = 125^\circ\text{C}$
$I_{SS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			$\pm 100$	nA	$V_{DS} = \pm 20\text{ V}$
<b>Electrical Characteristics - ON*</b>						
$V_{DS(th)}$	Gate Threshold Voltage		2	4	V	$V_{GS} = V_{DS}$ , $I_D = 250\text{ }\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.025 .060	$\Omega$	$V_{DS} = 10\text{ V}$ , $I_D = 80\text{ A}$ $T_C = 100^\circ\text{C}$
$I_{D(on)}$	On State Drain Current	55			A	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $V_{DS} = 10\text{ V}$
<b>Electrical Characteristics - Dynamic</b>						
$g_{fs}$	Forward Transconductance		16		S	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $I_D = 30\text{ A}$
$C_{iss}$	Input Capacitance			2500	pF	$V_{DS} = 25\text{ V}$
$C_{oss}$	Output Capacitance			960	pF	$V_{DS} = 0$
$C_{riss}$	Reverse Transfer Capacitance			250	pF	$f = 1\text{ MHz}$
<b>Electrical Characteristics - Switching On</b>						
$T_{don}$	Turn-On Time		110		nS	$V_{DS} = 25\text{ V}$ , $I_D = 55\text{ A}$
$t_r$	Rise Time		300		nS	$R_G = 50\text{ }\Omega$ , $V_{DS} = 10\text{ V}$
$(di/dt)_{on}$	Turn-On Current Slope		160		A/ $\mu\text{S}$	$V_{DS} = 40\text{ V}$ , $I_D = 55\text{ A}$
$Q_d$	Total Gate Charge		65		nC	$R_G = 50\text{ }\Omega$ , $V_{DS} = 10\text{ V}$ $V_{DS} = 25\text{ V}$ , $I_D = 30\text{ A}$ , $V_{GS} = 10\text{ V}$
<b>Electrical Characteristics - Switching Off</b>						
$T_{f(off)}$	Off Voltage Rise Time		160		nS	$V_{DS} = 40\text{ V}$ , $I_D = 55\text{ A}$
$t_f$	Fall Time		160		nS	$R_G = 50\text{ }\Omega$ , $V_{DS} = 10\text{ V}$
$t_{cross}$	Cross-Over Time		320	440	nS	
<b>Electrical Characteristics - Source Drain Diode</b>						
$I_{SD}$	Source Drain Current			55	A	
$I_{SDM}^*$	Source Drain Current (pulsed)			200	A	
$V_{SD}$	Forward On Voltage			1.6	V	$I_{SD} = 55\text{ A}$ , $V_{GS} = 0$
$t_r$	Reverse Recovery Time			100	nS	$I_{SD} = 55\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 25\text{ V}$ , $T_J = 150^\circ\text{C}$
$Q_r$	Reverse Recovery Charge			25	$\mu\text{C}$	
$I_{RRU}$	Reverse Recovery Current			5	A	

\*Pulsed: Pulse Duration  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 1.5\%$ .**OM50N06SA** ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Avalanche Characteristics		Min.	Typ.	Max.	Units	Test Conditions
$I_{AR}$	Avalanche Current			50	A	(repetitive or non-repetitive, $T_J = 25^\circ\text{C}$ )
$E_{AS}$	Single Pulse Avalanche Energy			400	mJ	(starting $T_J = 25^\circ\text{C}$ , $I_B = I_{AS}$ , $V_{DS} = 25\text{ V}$ )
$E_{AR}$	Repetitive Avalanche Energy			100	mJ	(pulse width limited by $T_{Jmax}$ , $\delta < 1\%$ )
$I_{RR}$	Avalanche Current			30	A	(repetitive or non-repetitive, $T_J = 100^\circ\text{C}$ )
<b>Electrical Characteristics - OFF</b>						
$V_{DRSS}$	Drain-Source Breakdown Voltage	60			V	$I_B = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )			250 1000	$\mu\text{A}$	$V_{DS} = \text{Max. Rat.}$ $V_{DS} = \text{Max. Rat.} \times 0.8$ , $T_C = 125^\circ\text{C}$
$I_{SS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			$\pm 100$	nA	$V_{DS} = \pm 20\text{ V}$
<b>Electrical Characteristics - ON*</b>						
$V_{DS(th)}$	Gate Threshold Voltage		2	4	V	$V_{GS} = V_{DS}$ , $I_D = 250\text{ }\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.028 .066	$\Omega$	$V_{DS} = 10\text{ V}$ , $I_D = 25\text{ A}$ $T_C = 100^\circ\text{C}$
$I_{D(on)}$	On State Drain Current	50			A	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $V_{DS} = 10\text{ V}$
<b>Electrical Characteristics - Dynamic</b>						
$g_{fs}$	Forward Transconductance		17		S	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $I_D = 25\text{ A}$
$C_{iss}$	Input Capacitance			2000	pF	$V_{DS} = 25\text{ V}$
$C_{oss}$	Output Capacitance			1000	pF	$V_{DS} = 0$
$C_{riss}$	Reverse Transfer Capacitance			300	pF	$f = 1\text{ MHz}$
<b>Electrical Characteristics - Switching On</b>						
$T_{don}$	Turn-On Time		45		nS	$V_{DS} = 25\text{ V}$ , $I_D = 29\text{ A}$
$t_r$	Rise Time		90		nS	$R_G = 4.7\text{ }\Omega$ , $V_{DS} = 10\text{ V}$
$(di/dt)_{on}$	Turn-On Current Slope		200		A/ $\mu\text{S}$	$V_{DS} = 40\text{ V}$ , $I_D = 50\text{ A}$
$Q_d$	Total Gate Charge		45		nC	$R_G = 50\text{ }\Omega$ , $V_{DS} = 10\text{ V}$ $V_{DS} = 40\text{ V}$ , $I_D = 50\text{ A}$ , $V_{GS} = 10\text{ V}$
<b>Electrical Characteristics - Switching Off</b>						
$T_{f(off)}$	Off Voltage Rise Time		160		nS	$V_{DS} = 40\text{ V}$ , $I_D = 50\text{ A}$
$t_f$	Fall Time		90		nS	$R_G = 50\text{ }\Omega$ , $V_{DS} = 10\text{ V}$
$t_{cross}$	Cross-Over Time		250		nS	
<b>Electrical Characteristics - Source Drain Diode</b>						
$I_{SD}$	Source Drain Current			50	A	
$I_{SDM}^*$	Source Drain Current (pulsed)			200	A	
$V_{SD}$	Forward On Voltage			2	V	$I_{SD} = 50\text{ A}$ , $V_{GS} = 0$
$t_r$	Reverse Recovery Time			150	nS	$I_{SD} = 50\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$ , $T_J = 150^\circ\text{C}$
$Q_r$	Reverse Recovery Charge			0.2	$\mu\text{C}$	
$I_{RRU}$	Reverse Recovery Current			4	A	

\*Pulsed: Pulse Duration  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 1.5\%$ .



OM50N06ST ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Avalanche Characteristics		Min.	Typ.	Max.	Units	Test Conditions
$I_{AP}$	Avalanche Current			50	A	(repetitive or non-repetitive, $T_J = 25^\circ\text{C}$ )
$E_{AS}$	Single Pulse Avalanche Energy			400	mJ	(starting $T_J = 25^\circ\text{C}$ , $I_B = I_{AS}$ , $V_{DS} = 25\text{ V}$ )
$E_{RP}$	Repetitive Avalanche Energy			100	mJ	(pulse width limited by $T_{Jmax}$ , $\delta < 1\%$ )
$I_{AF}$	Avalanche Current			30	A	(repetitive or non-repetitive, $T_J = 100^\circ\text{C}$ )
<b>Electrical Characteristics - OFF</b>						
$V_{DSS}$	Drain-Source Breakdown Voltage	60			V	$I_B = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )			250	$\mu\text{A}$	$V_{DS} = \text{Max. Flat}$
$I_{DSS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			1000	$\mu\text{A}$	$V_{DS} = \text{Max. Flat} \times 0.8$ , $T_C = 125^\circ\text{C}$
$I_{DSS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			$\pm 100$	nA	$V_{DS} = \pm 20\text{ V}$
<b>Electrical Characteristics - ON*</b>						
$V_{DS(th)}$	Gate Threshold Voltage	2		4	V	$V_{GS} = V_{DS}$ , $I_D = 250\text{ }\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.033	$\Omega$	$V_{GS} = 10\text{ V}$ , $I_D = 25\text{ A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.066	$\Omega$	$T_C = 100^\circ\text{C}$
$I_{D(on)}$	On State Drain Current	50			A	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $V_{DS} = 10\text{ V}$
<b>Electrical Characteristics - Dynamic</b>						
$g_{fs}$	Forward Transconductance	17			S	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $I_D = 25\text{ A}$
$C_{iss}$	Input Capacitance		2000		pF	$V_{DS} = 25\text{ V}$
$C_{oss}$	Output Capacitance		1000		pF	$V_{GS} = 0$
$C_{res}$	Reverse Transfer Capacitance		300		pF	$f = 1\text{ MHz}$
<b>Electrical Characteristics - Switching On</b>						
$T_{don}$	Turn-On Time		45		nS	$V_{DS} = 25\text{ V}$ , $I_D = 25\text{ A}$
$t_r$	Rise Time		90		nS	$R_G = 4.7\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$(di/dt)_{on}$	Turn-On Current Slope		200		A/ $\mu\text{S}$	$V_{DS} = 40\text{ V}$ , $I_D = 50\text{ A}$
$Q_{on}$	Total Gate Charge		45		nC	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
<b>Electrical Characteristics - Switching Off</b>						
$T_{d(off)}$	Off Voltage Rise Time		160		nS	$V_{DS} = 40\text{ V}$ , $I_D = 50\text{ A}$
$t_f$	Fall Time		90		nS	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$t_{cross}$	Cross-Over Time		250		nS	
<b>Electrical Characteristics - Source Drain Diode</b>						
$I_{SD}$	Source Drain Current			50	A	
$I_{SDP}$	Source Drain Current (pulsed)			200	A	
$V_{SD}$	Forward On Voltage			2	V	$I_{SD} = 50\text{ A}$ , $V_{GS} = 0$
$t_r$	Reverse Recovery Time			150	nS	$I_{SD} = 50\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$
$Q_r$	Reverse Recovery Charge			0.2	$\mu\text{C}$	$V_P = 30\text{ V}$ , $T_J = 150^\circ\text{C}$
$I_{RFM}$	Reverse Recovery Current			4	A	

\*Pulsed: Pulse Duration  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 1.5\%$ .

OM60N06SA ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Avalanche Characteristics		Min.	Typ.	Max.	Units	Test Conditions
$I_{AP}$	Avalanche Current			55	A	(repetitive or non-repetitive, $T_J = 25^\circ\text{C}$ )
$E_{AS}$	Single Pulse Avalanche Energy			520	mJ	(starting $T_J = 25^\circ\text{C}$ , $I_B = I_{AS}$ , $V_{DS} = 25\text{ V}$ )
$E_{RP}$	Repetitive Avalanche Energy			130	mJ	(pulse width limited by $T_{Jmax}$ , $\delta < 1\%$ )
$I_{AF}$	Avalanche Current			34	A	(repetitive or non-repetitive, $T_J = 100^\circ\text{C}$ )
<b>Electrical Characteristics - OFF</b>						
$V_{DSS}$	Drain-Source Breakdown Voltage	50			V	$I_B = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )			250	$\mu\text{A}$	$V_{DS} = \text{Max. Flat}$
$I_{DSS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			1000	$\mu\text{A}$	$V_{DS} = \text{Max. Flat} \times 0.8$ , $T_C = 125^\circ\text{C}$
$I_{DSS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			$\pm 100$	nA	$V_{DS} = \pm 20\text{ V}$
<b>Electrical Characteristics - ON*</b>						
$V_{DS(th)}$	Gate Threshold Voltage	2		4	V	$V_{GS} = V_{DS}$ , $I_D = 250\text{ }\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.025	$\Omega$	$V_{GS} = 10\text{ V}$ , $I_D = 30\text{ A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.050	$\Omega$	$T_C = 100^\circ\text{C}$
$I_{D(on)}$	On State Drain Current	55			A	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $V_{DS} = 10\text{ V}$
<b>Electrical Characteristics - Dynamic</b>						
$g_{fs}$	Forward Transconductance	16			S	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $I_D = 30\text{ A}$
$C_{iss}$	Input Capacitance		2500		pF	$V_{DS} = 25\text{ V}$
$C_{oss}$	Output Capacitance		950		pF	$V_{GS} = 0$
$C_{res}$	Reverse Transfer Capacitance		250		pF	$f = 1\text{ MHz}$
<b>Electrical Characteristics - Switching On</b>						
$T_{don}$	Turn-On Time		110		nS	$V_{DS} = 25\text{ V}$ , $I_D = 55\text{ A}$
$t_r$	Rise Time		300		nS	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$(di/dt)_{on}$	Turn-On Current Slope		160		A/ $\mu\text{S}$	$V_{DS} = 40\text{ V}$ , $I_D = 55\text{ A}$
$Q_{on}$	Total Gate Charge		85		nC	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
<b>Electrical Characteristics - Switching Off</b>						
$T_{d(off)}$	Off Voltage Rise Time		160		nS	$V_{DS} = 40\text{ V}$ , $I_D = 55\text{ A}$
$t_f$	Fall Time		160		nS	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$t_{cross}$	Cross-Over Time		320		nS	
<b>Electrical Characteristics - Source Drain Diode</b>						
$I_{SD}$	Source Drain Current			55	A	
$I_{SDP}$	Source Drain Current (pulsed)			200	A	
$V_{SD}$	Forward On Voltage			1.6	V	$I_{SD} = 55\text{ A}$ , $V_{GS} = 0$
$t_r$	Reverse Recovery Time			100	nS	$I_{SD} = 55\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$
$Q_r$	Reverse Recovery Charge			25	$\mu\text{C}$	$V_P = 25\text{ V}$ , $T_J = 150^\circ\text{C}$
$I_{RFM}$	Reverse Recovery Current			5	A	

\*Pulsed: Pulse Duration  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 1.5\%$ .

OM50N05SA ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Avalanche Characteristics		Min.	Typ.	Max.	Units	Test Conditions
$I_{AP}$	Avalanche Current			50	A	(repetitive or non-repetitive, $T_J = 25^\circ\text{C}$ )
$E_{AS}$	Single Pulse Avalanche Energy			400	mJ	(starting $T_J = 25^\circ\text{C}$ , $I_B = I_{AS}$ , $V_{DP} = 25\text{ V}$ )
$E_{AP}$	Repetitive Avalanche Energy			100	mJ	(pulse width limited by $T_{Jmax}$ , $\delta < 1\%$ )
$I_{AP}$	Avalanche Current			30	A	(repetitive or non-repetitive, $T_J = 100^\circ\text{C}$ )
Electrical Characteristics - OFF						
$V_{DS(oss)}$	Drain-Source Breakdown Voltage	50			V	$I_B = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$
$I_{ZSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )			250 1000	$\mu\text{A}$	$V_{DS} = \text{Max. Rat.}$ $V_{DS} = \text{Max. Rat.} \times 0.8$ , $T_C = 125^\circ\text{C}$
$I_{SSS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			$\pm 100$	nA	$V_{DS} = \pm 20\text{ V}$
Electrical Characteristics - ON*						
$V_{DS(th)}$	Gate Threshold Voltage	2		4	V	$V_{GS} = V_{DS}$ , $I_B = 250\text{ }\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.028 .066	$\Omega$	$V_{GS} = 10\text{ V}$ , $I_B = 25\text{ A}$ $T_C = 100^\circ\text{C}$
$I_{D(on)}$	On State Drain Current	50			A	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $V_{GS} = 10\text{ V}$
Electrical Characteristics - Dynamic						
$g_{fs}$	Forward Transconductance	17			S	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $I_B = 25\text{ A}$
$C_{iss}$	Input Capacitance		2000		pF	$V_{GS} = 25\text{ V}$
$C_{oss}$	Output Capacitance		1000		pF	$V_{GS} = 0$
$C_{res}$	Reverse Transfer Capacitance		300		pF	$f = 1\text{ MHz}$
Electrical Characteristics - Switching On						
$T_{don}$	Turn-On Time		45		nS	$V_{DP} = 25\text{ V}$ , $I_B = 29\text{ A}$
$t_r$	Rise Time		90		nS	$R_G = 4.7\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$(di/dt)_{on}$	Turn-On Current Slope		200		A/ $\mu\text{s}$	$V_{DP} = 40\text{ V}$ , $I_B = 50\text{ A}$
						$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$Q_g$	Total Gate Charge		45		nC	$V_{DP} = 40\text{ V}$ , $I_B = 50\text{ A}$ , $V_{GS} = 10\text{ V}$
Electrical Characteristics - Switching Off						
$T_{d(off)}$	Off Voltage Fall Time		160		nS	$V_{DP} = 40\text{ V}$ , $I_B = 50\text{ A}$
$t_f$	Fall Time		90		nS	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$t_{oss}$	Cross-Over Time		250		nS	
Electrical Characteristics - Source Drain Diode						
$I_{SD}$	Source Drain Current			50	A	
$I_{SDM}^*$	Source Drain Current (pulsed)			200	A	
$V_{SD}$	Forward On Voltage			2	V	$I_{SD} = 50\text{ A}$ , $V_{GS} = 0$
$t_r$	Reverse Recovery Time			150	nS	$I_{SD} = 50\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$
						$V_R = 30\text{ V}$ , $T_J = 150^\circ\text{C}$
$Q_r$	Reverse Recovery Charge			0.2	$\mu\text{C}$	
$I_{RRM}$	Reverse Recovery Current			4	A	

\*Pulsed: Pulse Duration  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 1.5\%$ .

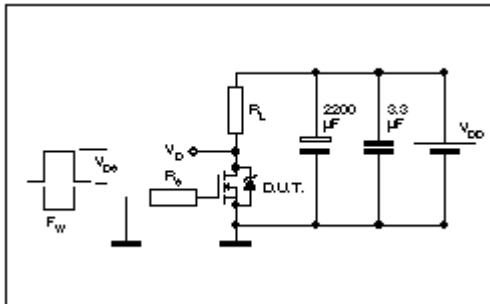
3.1

OM50N05ST ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

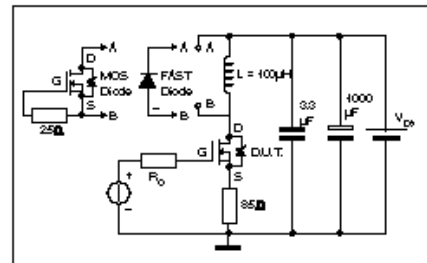
Avalanche Characteristics		Min.	Typ.	Max.	Units	Test Conditions
$I_{AP}$	Avalanche Current			50	A	(repetitive or non-repetitive, $T_J = 25^\circ\text{C}$ )
$E_{AS}$	Single Pulse Avalanche Energy			400	mJ	(starting $T_J = 25^\circ\text{C}$ , $I_B = I_{AS}$ , $V_{DP} = 25\text{ V}$ )
$E_{AP}$	Repetitive Avalanche Energy			100	mJ	(pulse width limited by $T_{Jmax}$ , $\delta < 1\%$ )
$I_{AP}$	Avalanche Current			30	A	(repetitive or non-repetitive, $T_J = 100^\circ\text{C}$ )
Electrical Characteristics - OFF						
$V_{DS(oss)}$	Drain-Source Breakdown Voltage	50			V	$I_B = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$
$I_{ZSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )			250 1000	$\mu\text{A}$	$V_{DS} = \text{Max. Rat.}$ $V_{DS} = \text{Max. Rat.} \times 0.8$ , $T_C = 125^\circ\text{C}$
$I_{SSS}$	Gate-Body Leakage Current ( $V_{GS} = 0$ )			$\pm 100$	nA	$V_{DS} = \pm 20\text{ V}$
Electrical Characteristics - ON*						
$V_{DS(th)}$	Gate Threshold Voltage	2		4	V	$V_{GS} = V_{DS}$ , $I_B = 250\text{ }\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On Resistance			.033 .066	$\Omega$	$V_{GS} = 10\text{ V}$ , $I_B = 25\text{ A}$ $T_C = 100^\circ\text{C}$
$I_{D(on)}$	On State Drain Current	50			A	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $V_{GS} = 10\text{ V}$
Electrical Characteristics - Dynamic						
$g_{fs}$	Forward Transconductance	17			S	$V_{GS} > I_{D(on)} \times R_{DS(on)}$ , $I_B = 25\text{ A}$
$C_{iss}$	Input Capacitance		2000		pF	$V_{GS} = 25\text{ V}$
$C_{oss}$	Output Capacitance		1000		pF	$V_{GS} = 0$
$C_{res}$	Reverse Transfer Capacitance		300		pF	$f = 1\text{ MHz}$
Electrical Characteristics - Switching On						
$T_{don}$	Turn-On Time		45		nS	$V_{DP} = 25\text{ V}$ , $I_B = 29\text{ A}$
$t_r$	Rise Time		90		nS	$R_G = 4.7\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$(di/dt)_{on}$	Turn-On Current Slope		200		A/ $\mu\text{s}$	$V_{DP} = 40\text{ V}$ , $I_B = 50\text{ A}$
						$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$Q_g$	Total Gate Charge		45		nC	$V_{DP} = 40\text{ V}$ , $I_B = 50\text{ A}$ , $V_{GS} = 10\text{ V}$
Electrical Characteristics - Switching Off						
$T_{d(off)}$	Off Voltage Fall Time		160		nS	$V_{DP} = 40\text{ V}$ , $I_B = 50\text{ A}$
$t_f$	Fall Time		90		nS	$R_G = 50\text{ }\Omega$ , $V_{GS} = 10\text{ V}$
$t_{oss}$	Cross-Over Time		250		nS	
Electrical Characteristics - Source Drain Diode						
$I_{SD}$	Source Drain Current			50	A	
$I_{SDM}^*$	Source Drain Current (pulsed)			200	A	
$V_{SD}$	Forward On Voltage			2	V	$I_{SD} = 50\text{ A}$ , $V_{GS} = 0$
$t_r$	Reverse Recovery Time			150	nS	$I_{SD} = 50\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$
						$V_R = 30\text{ V}$ , $T_J = 150^\circ\text{C}$
$Q_r$	Reverse Recovery Charge			0.2	$\mu\text{C}$	
$I_{RRM}$	Reverse Recovery Current			4	A	

\*Pulsed: Pulse Duration  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 1.5\%$ .

Switching Times Test Circuits  
For Resistive Load

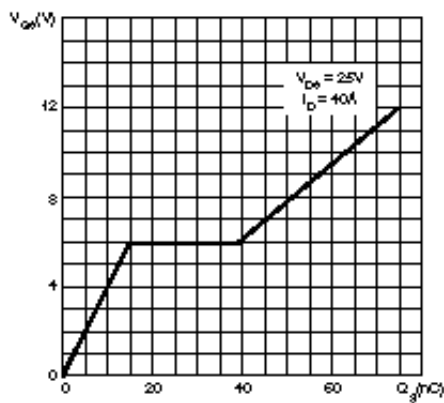


Test Circuit For Inductive Load Switching  
And Diode Reverse Recovery Time

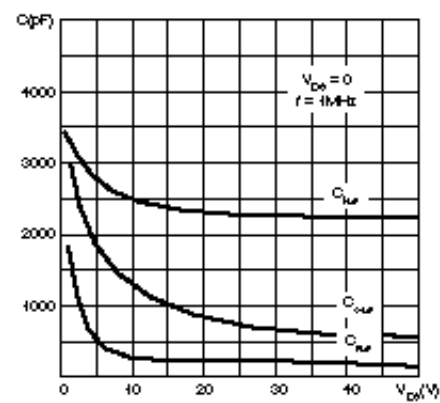


## TYPICAL CHARACTERISTICS

Gate Charge vs Gate-Source Voltage

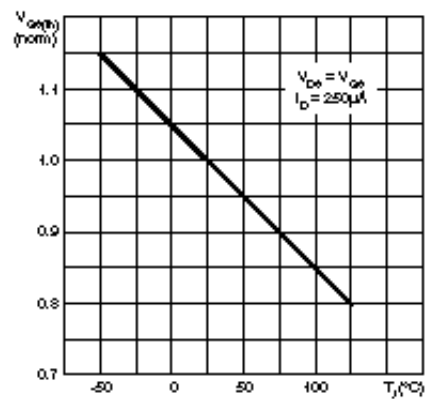


Capacitance Variations



3.1

Normalized Gate Threshold  
Voltage vs Temperature



Normalized On Resistance  
vs Temperature

