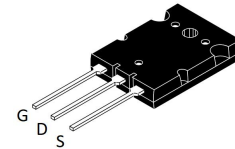
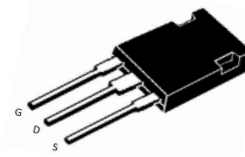


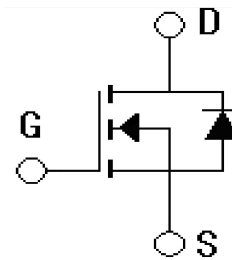
Features

- $V_{DS}=600V, I_D=60A$
 $R_{DS(on)} < 0.18\Omega @ V_{GS}=10V$
- 100% avalanche tested
- Minimum Lot-to-Lot variations for robust device
- performance and reliable operation



Applications

- ZVS phase shifted and other full bridge
- Half bridge
- PFC and other boost converter
- Buck converter
- Single and two switch forward
- Flyback



Absolute Ratings ($T_C=25^\circ C$)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	600	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current-continuous	I_D	60	A
Drain Current-pulse (1)	I_{DM}	210	A
Single Pulsed Avalanche Energy (2)	E_{AS}	1580	mJ
Avalanche Current, Repetitive or Non-Repetitive	I_{AR}	28	A
Maximum Power Dissipation	PD $T_C=25^\circ C$ Derate above $25^\circ C$	1040	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ C$

Electrical Characteristics ($T_{CASE}=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	600	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=V_{DSS}, V_{GS}=0V$	-	-	25	μA

Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	± 100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 2.5mA$	2.5	4	5	V
Static Drain-Source On-Resistance (3)	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 28A$	-	0.15	0.18	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 50V, I_D = 28A$	-	55	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	11.3	-	nF
Output capacitance	C_{oss}		-	1040	-	pF
Reverse transfer capacitance	C_{rss}		-	115	-	pF

Electrical Characteristics ($T_{CASE} = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching-Characteristics						
Turn-On delay time	$t_{d(on)}$	$V_{DS} = 400V, I_D = 28A, R_g = 2.2\Omega, V_{GS} = 15V(4)$	-	65	-	ns
Turn-On rise time	t_r		-	75	-	ns
Turn-Off delay time	$t_{d(off)}$		-	190	-	ns
Turn-Off rise time	t_f		-	60	-	ns
Total Gate Charge	Q_g	$V_{DS} = 300V, I_D = 28A, V_{GS} = 0-10V$	-	280	-	nC
Gate-Source charge	Q_{gs}		-	60	-	nC
Gate-Drain charge	Q_{gd}		-	120	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain-Source Diode Forward Current	V_{SD}	$V_{GS} = 0V, I_S = 28A$	-	-	1.0	V
Diode Forward Current	I_S	$TC = 25^\circ C$	-	-	60	A
Reverse recovery time	T_{rr}	$I_S = 6A, di/dt = 100A/\mu S$	-	250	290	nS
Reverse recovery charge	Q_{rr}	$VR = 100V, V_{GS} = 0V(3)$	-	1.41	-	μC

Thermal Characteristic

Parameter	Symbol	Value	Unit
Thermal Resistance, junction to Case	$R_{th(j-C)}$	0.12	°C/W
Case to Sink Thermal Resistance, Flat, Greased Surface	$R_{th(C-S)}$	0.11	

Order Message

Marking	Package
MS60N60HGB3	TO-264
MS60N60HGC1	TO-247plus

Notes:

1. Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature.
2. Starting at $T_J = 25^\circ\text{C}$, $L = 4.03\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 28\text{A}$.
3. Pulse test: Pulse Width < $380\mu\text{s}$, duty cycle < 2%
4. R_G is external gate resistance, not including internal gate resistance or gate driver impedance.

Electrical Characteristics

Figure 1, Output Characteristics

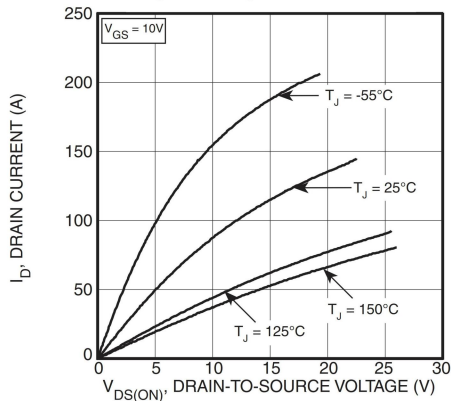


Figure 2, Output Characteristics

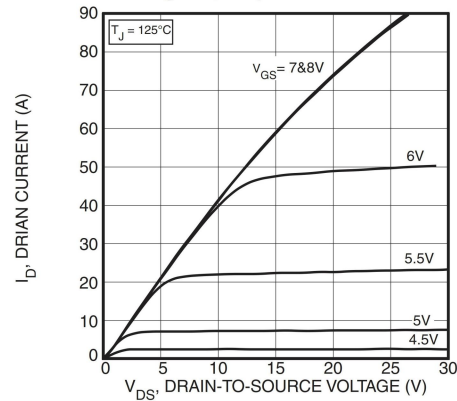


Figure 3, $R_{DS(ON)}$ vs Junction Temperature

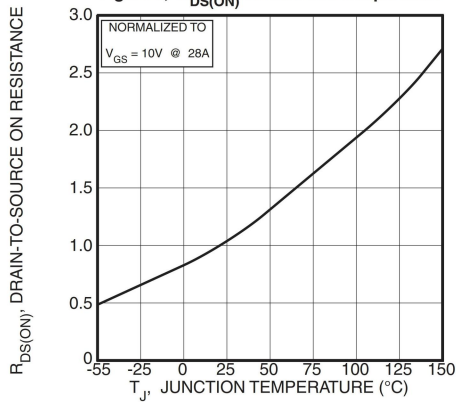


Figure 4, Transfer Characteristics

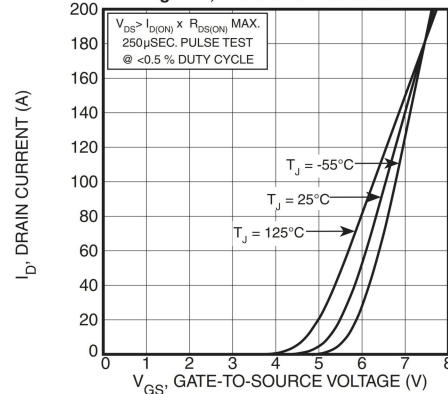


Figure 5, Gain vs Drain Current

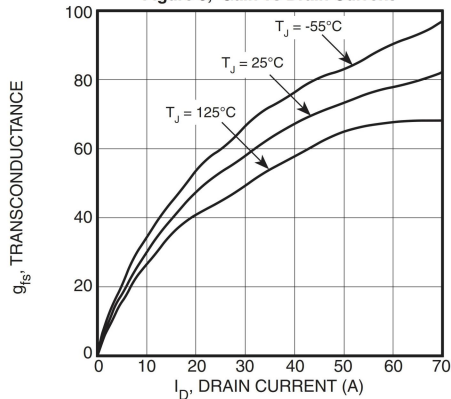


Figure 6, Capacitance vs Drain-to-Source Voltage

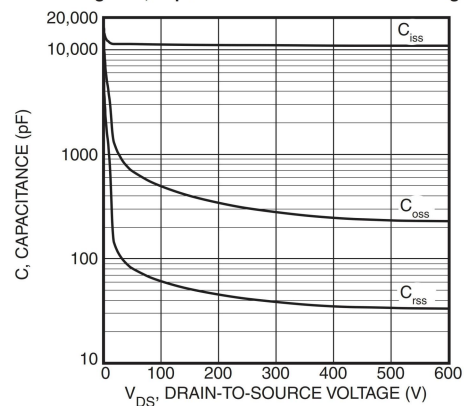


Figure 7, Gate Charge vs Gate-to-Source Voltage

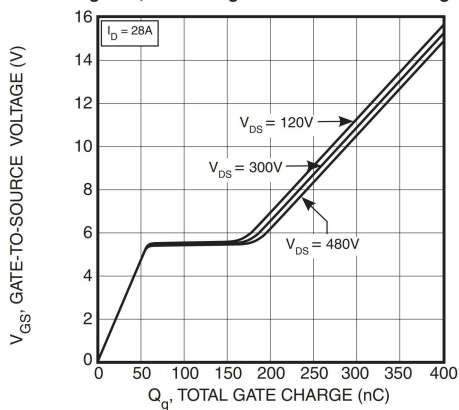


Figure 8, Reverse Drain Current vs Source-to-Drain Voltage

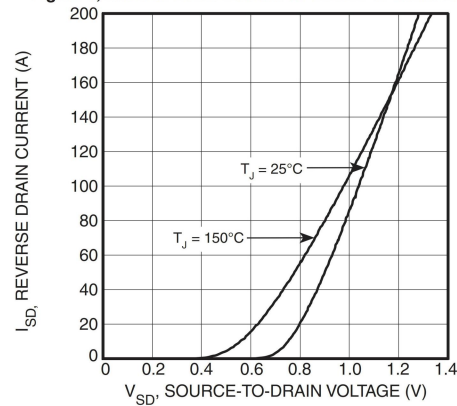


Figure 9, Forward Safe Operating Area

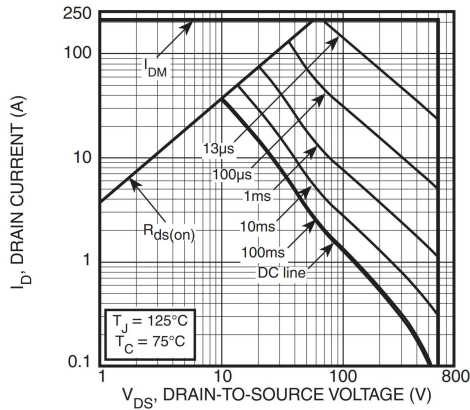


Figure 10, Maximum Forward Safe Operating Area

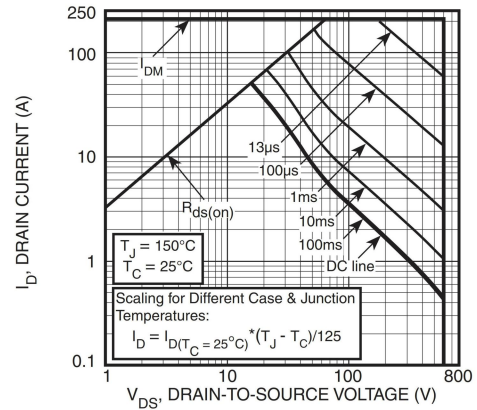
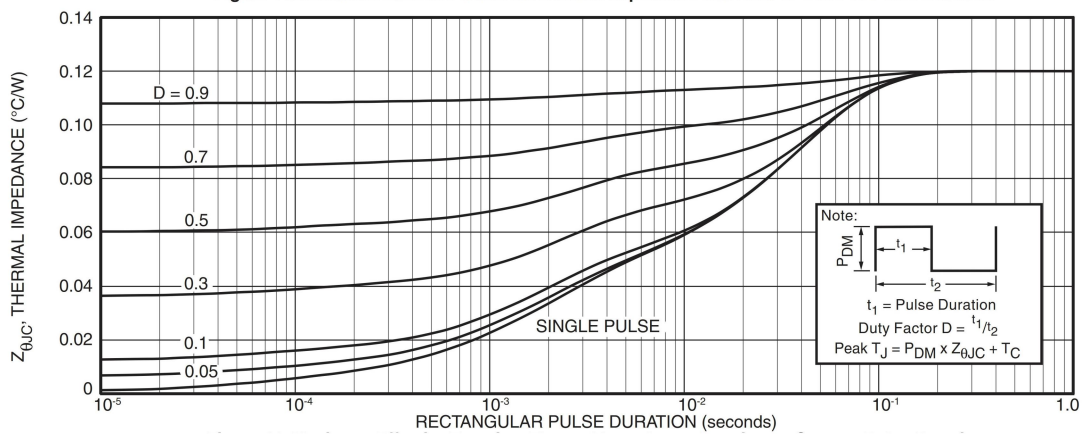
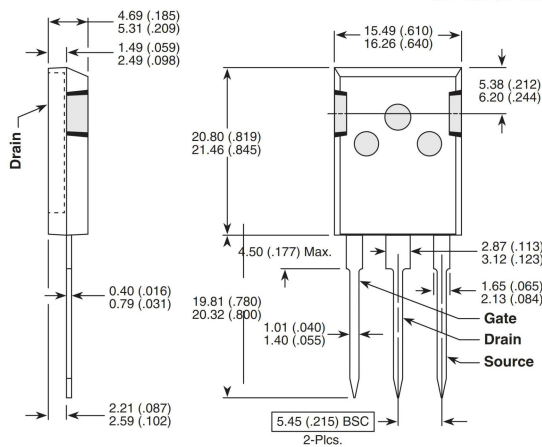


Figure 11. Maximum Effective Transient Thermal Impedance Junction-to-Case vs Pulse Duration



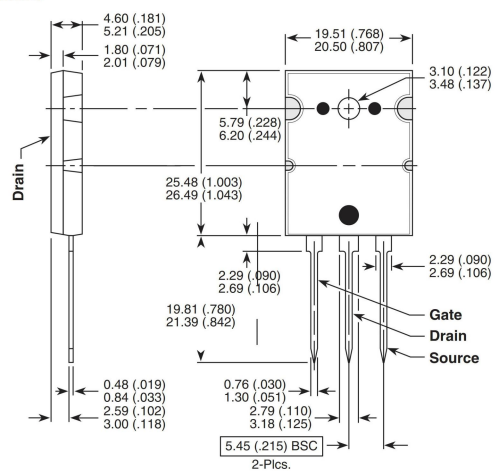
Package Mechanical DATA

e3 100% Sn Plated



These dimensions are equal to the TO-247 without the mounting hole.
Dimensions in Millimeters and (Inches)

247plus



Dimensions in Millimeters and (Inches)

TO-264

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