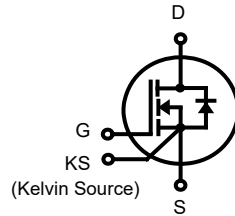


## Silicon Carbide Enhancement Mode MOSFET

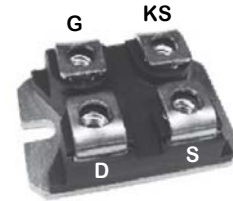
### Features

- ◆  $V_{DSS} = 1200V$
- ◆  $R_{DS(ON)}$  Tpy. 16 mΩ @  $V_{GS} = 18V$
- ◆ Fully Avalanche Rated
- ◆ Pb Free & RoHS Compliant
- ◆ Isolation Type Package
- ◆ Electrically Isolation base plate

Preliminary



### SOT-227



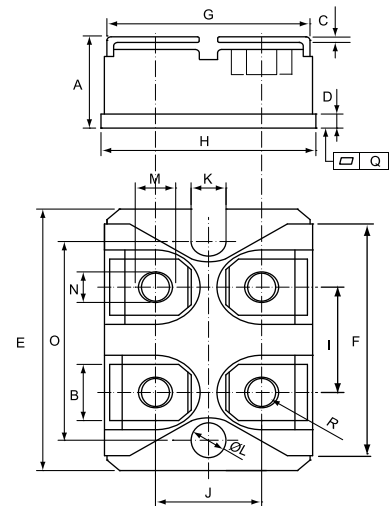
Dimensions in inches and (millimeters)

### Applications

- ◆ Solar Inverters
- ◆ Power Converters
- ◆ Motor Drive
- ◆ Switch Mode Power Supplies
- ◆ Battery Chargers

### Absolute Maximum Ratings ( $T_c=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Rated	Unit
Drain-Source Voltage	$V_{DS}$	1200	V
Gate-Source Voltage	$V_{GS}$	-5/+18	V
Drain Current-Continuous	$I_D$	180 120	A
	@ $T_c = 25^\circ C$ @ $T_c = 100^\circ C$		
Drain Current-Pulsed	$I_{DM}$	360	A
	@ $T_c = 25^\circ C$		
Maximum Power Dissipation	$P_D$	800	W
Storage Temperature Range	$T_{STG}$	-55 to +175	$^\circ C$
Operating Junction Temperature Range	$T_{VJ}$	-55 to +175	$^\circ C$
Thermal Resistance, Junction-to-Case	$R_{\theta_{JC}}$	0.175	$^\circ C/W$
Isolation Voltage (A.C. 1 minute) between All Terminals and Baseplate	$V_{iso}$	2500	V
Mounting torque (M4 Screw)	To heatsink To terminals	1.3 1.1	Nm



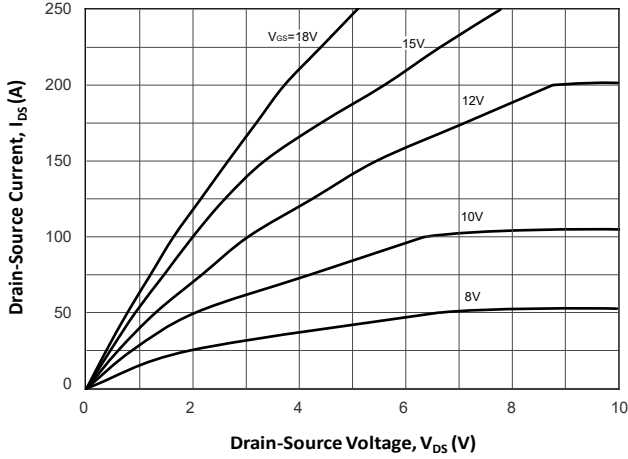
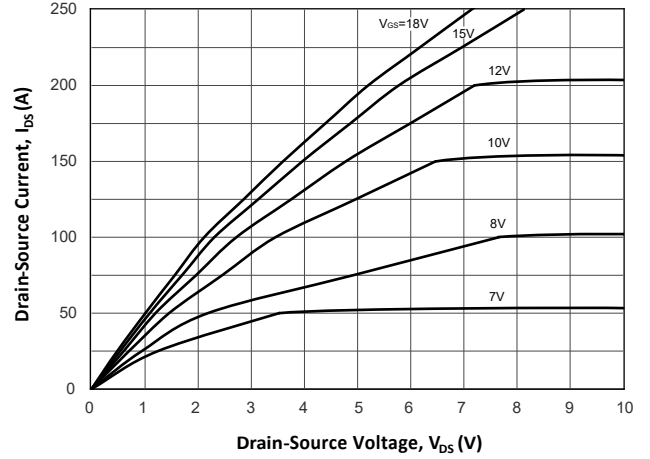
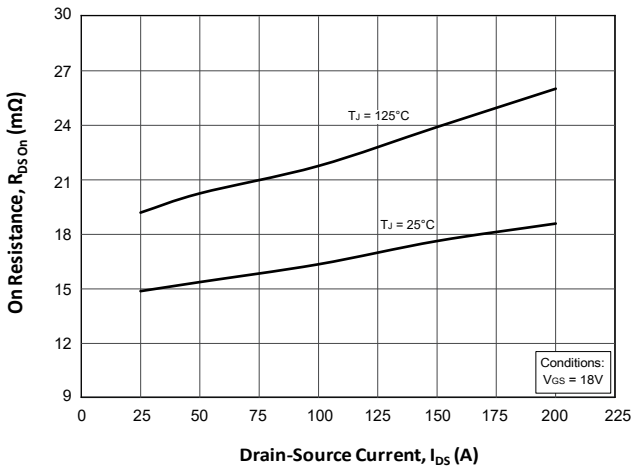
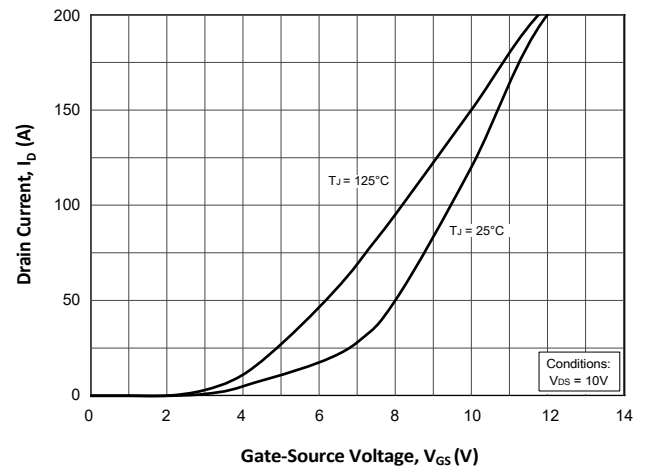
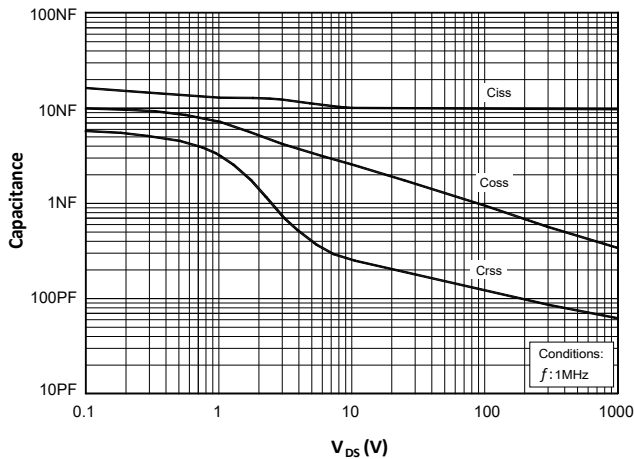
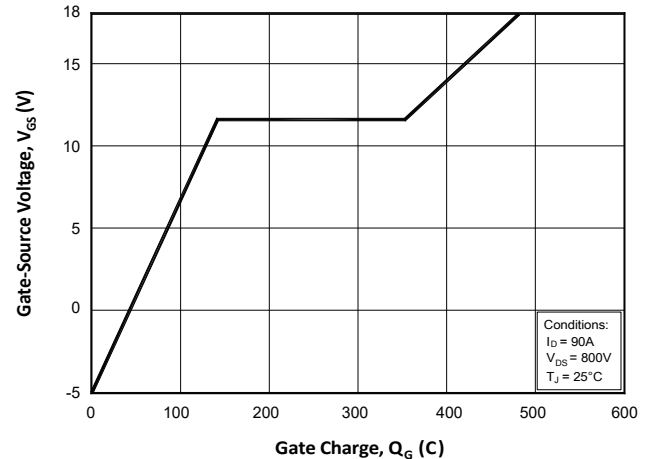
	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.460	0.483	11.68	12.28
B	0.307	0.323	7.80	8.20
C	0.030	0.033	0.75	0.85
D	0.071	0.081	1.80	2.05
E	1.488	1.504	37.80	38.20
F	1.248	1.260	31.70	32.00
G	0.917	0.957	23.30	24.30
H	0.996	1.008	25.30	25.60
I	0.579	0.602	14.70	15.30
J	0.492	0.516	12.50	13.10
K	0.161	0.169	4.10	4.30
L	0.161	0.169	4.10	4.30
M	0.181	0.197	4.60	5.00
N	0.165	0.181	4.20	4.60
O	1.181	1.197	30.00	30.40
Q	-0.002	0.004	-0.05	0.10
R	M4*8			

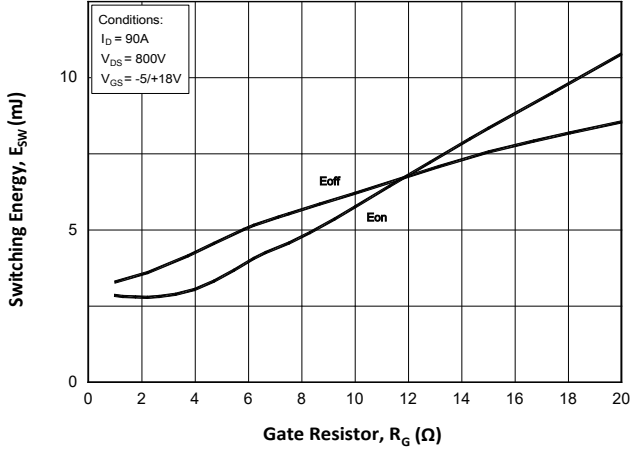
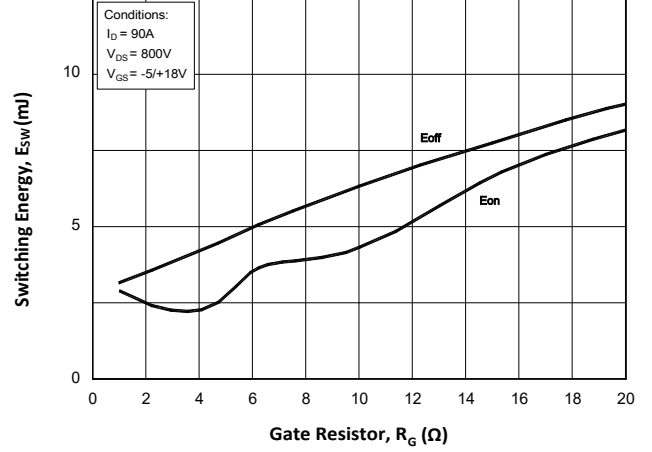
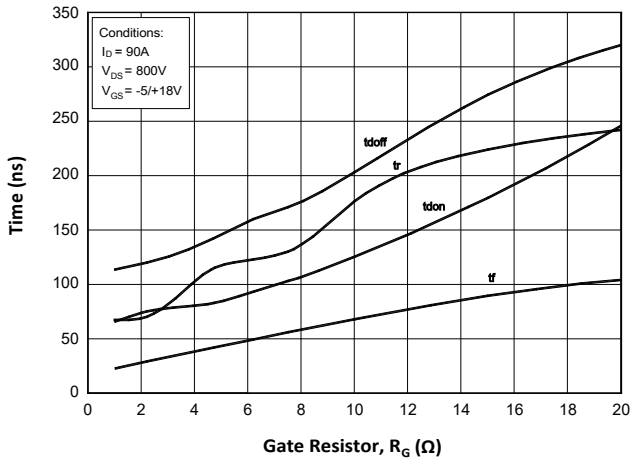
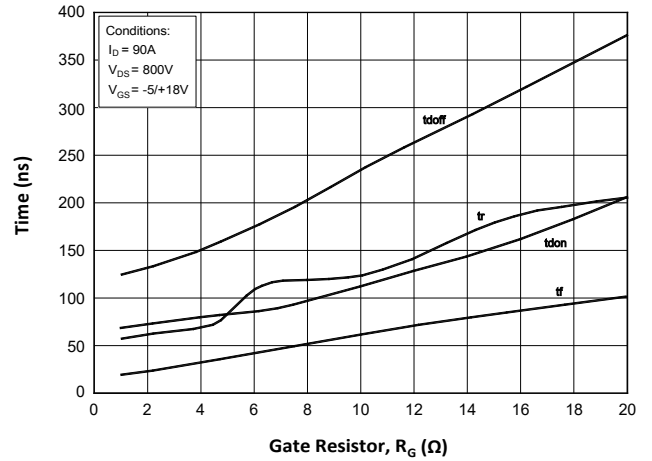
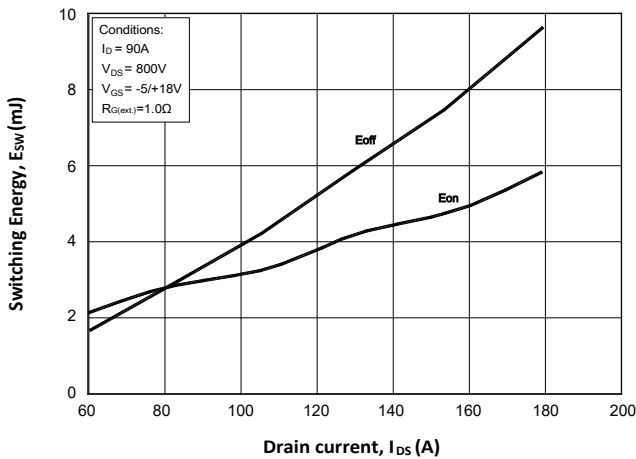
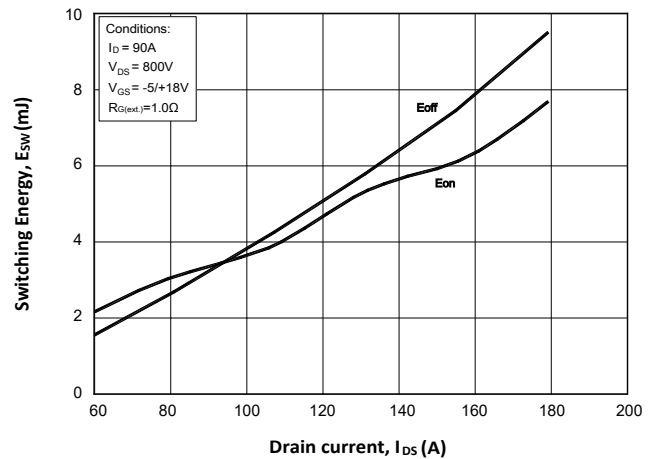
**Electrical Characteristics @  $T_{VJ} = 25^{\circ}\text{C}$  (unless otherwise specified)**

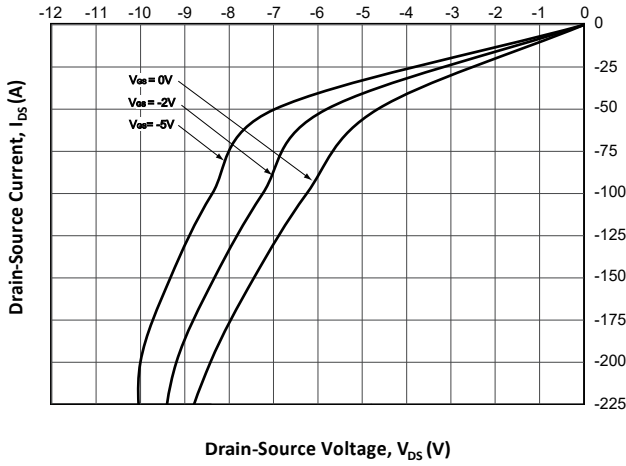
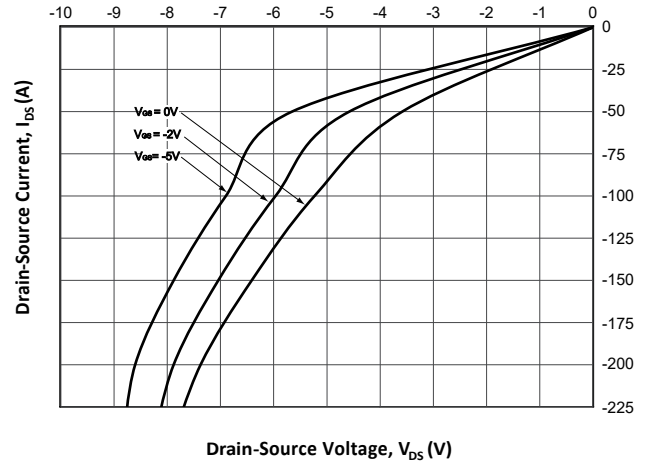
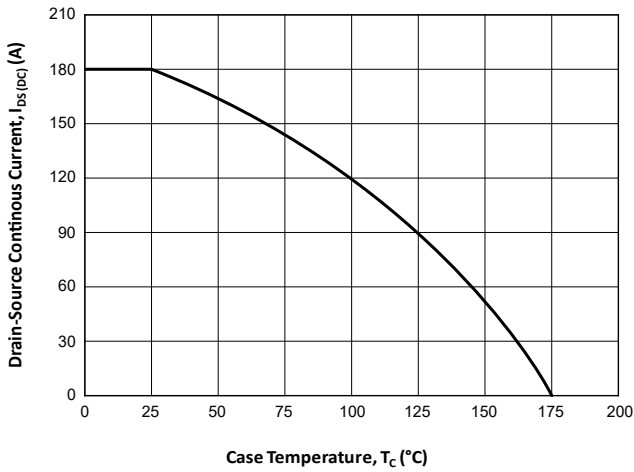
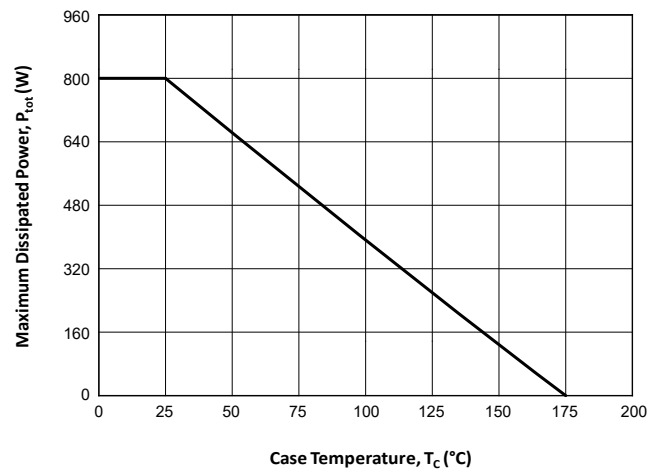
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit		
<b>OFF Characteristics</b>								
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V$ , $I_{DS} = 0.1mA$	1200	-	-	V		
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0V$ , $V_{DS} = 1200V$	-	-	200	$\mu A$		
Gate-Body Leakage	$I_{GSS}$	$V_{GS} = 18V$ , $V_{DS} = 0V$	-	-	500	nA		
<b>ON Characteristics</b>								
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_{DS} = 8mA$	2.0	2.5	4.5	V		
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 18V$ , $I_{DS} = 90A$	-	16	18	m $\Omega$		
Internal Gate Resistance	$R_{G(int.)}$		-	2.2	-	$\Omega$		
<b>Dynamic Characteristics</b>								
Input Capacitance	$C_{iss}$	$V_{DS} = 800V$ $V_{GS} = 0V$ $V_{AC} = 1V$ Freq.=1MHz	-	9.826	-	nF		
Output Capacitance	$C_{oss}$		-	375	-	pF		
Reverse Transfer Capacitance	$C_{rss}$		-	65.5	-			
Total Gate Charge	$Q_g$	$V_{DS} = 800V$ $V_{GS} = -5/+18V$ $I_{DS} = 90A$	-	481	-	nC		
Gate to Source Charge	$Q_{gs}$		-	142	-			
Gate to Drain Charge	$Q_{gd}$		-	211	-			
<b>Switching Characteristics</b>								
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 800V$ $V_{GS} = -5/+18V$ $I_{DS} = 90A$ $R_G = 1.0\Omega$	$T_{VJ} = 25^{\circ}\text{C}$	-	69	-	ns	
			$T_{VJ} = 125^{\circ}\text{C}$	-	66	-		
Rise Time	$t_r$		$T_{VJ} = 25^{\circ}\text{C}$	-	59	-		
			$T_{VJ} = 125^{\circ}\text{C}$	-	62	-		
Turn-Off Delay Time	$t_{d(off)}$		$T_{VJ} = 25^{\circ}\text{C}$	-	112	-		
			$T_{VJ} = 125^{\circ}\text{C}$	-	122	-		
Fall Time	$t_f$		$T_{VJ} = 25^{\circ}\text{C}$	-	23	-		
			$T_{VJ} = 125^{\circ}\text{C}$	-	20	-		
Turn-On Switching Energy	$E_{on}$		$V_{DD} = 800V$ $V_{GS} = -5V/+18V$ $I_D = 90A$ $R_{G(ext)} = 1.0\Omega$	$T_{VJ} = 25^{\circ}\text{C}$	-	1.96	-	mJ
				$T_{VJ} = 125^{\circ}\text{C}$	-	3.10	-	
Turn-Off Switching Energy	$E_{off}$	$T_{VJ} = 25^{\circ}\text{C}$		-	3.30	-		
		$T_{VJ} = 125^{\circ}\text{C}$		-	3.25	-		
<b>Body Diode Characteristics , at <math>T_J = 25^{\circ}\text{C}</math> , unless otherwise specified</b>								
Continuous Diode Forward Current	$I_{SD}$	$V_{GS} = 0V$		-	90	-	A	
Drain-Source Reverse Voltage	$V_{SD}$	$I_{SD} = 50A$ , $V_{GS} = 0V$		-	4.65	-	V	
MOSFET Forward Recovery Charge	$Q_{rr}$	$V_{DD} = 800V$ , $I_{SD} = 90A$ $V_{GS} = 0V$ , $di/dt = 2616A/\mu s$		-	768	-	nC	
MOSFET Peak Forward Recovery Current	$I_{rm}$	$V_{DD} = 800V$ , $I_{SD} = 90A$ $V_{GS} = 0V$ , $di/dt = 2616A/\mu s$	-	40	-	A		
MOSFET Reverse Recovery Time	$T_{rr}$	$V_{DD} = 800V$ , $I_{SD} = 90A$ $V_{GS} = 0V$ , $di/dt = 2616A/\mu s$	-	32	-	ns		

Notes:

 1. Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $> 2\%$ .

**Typical Characteristics**
**Fig.1 Output Characteristics at  $T_J = 25^\circ\text{C}$** 

**Fig.2 Output Characteristics at  $T_J = 125^\circ\text{C}$** 

**Fig.3 Drain Source on Resistance**

**Fig.4 Transfer Characteristics**

**Fig.5 Capacitances vs. Drain-Source Voltage**

**Fig.6 Gate Charge Characteristics**


**Typical Characteristics**
**Fig.7 Switching losses vs  $R_G$  change  $T_J=25^\circ\text{C}$** 

**Fig.8 Switching losses vs  $R_G$  change  $T_J=125^\circ\text{C}$** 

**Fig.9 Switching Timer vs  $R_G$  Change  $T_J=25^\circ\text{C}$** 

**Fig.10 Switching Timer vs  $R_G$  Change  $T_J=125^\circ\text{C}$** 

**Fig.11 Clamped Inductive Switching Energy vs. Drain Current  $T_J=25^\circ\text{C}$** 

**Fig.12 Clamped Inductive Switching Energy vs. Drain Current  $T_J=125^\circ\text{C}$** 


**Typical Characteristics**
**Fig.13 Body Diode curves  $T_J = 25^\circ\text{C}$** 

**Fig.14 Body Diode curves  $T_J = 125^\circ\text{C}$** 

**Fig.15 Continuous Drain Current (MOSFET) vs. Case Temperature**

**Fig.16 Max. Power Dissipation (MOSFET) Derating vs. Case Temperature**


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