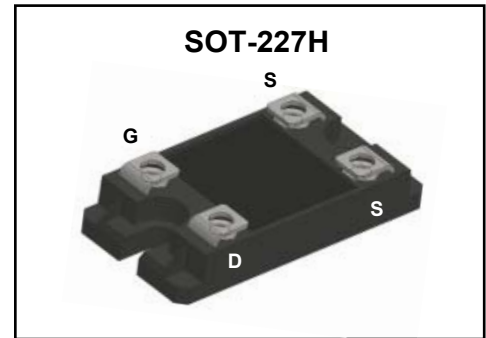
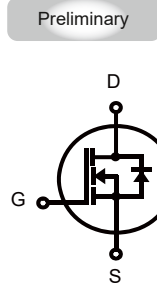


SiC MOSFET Power Module

Features

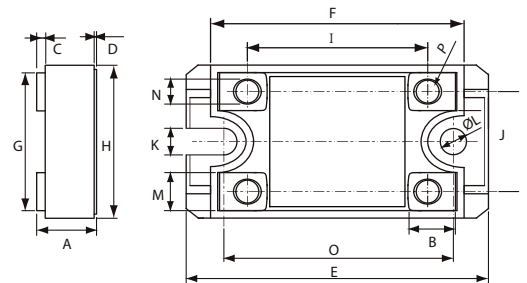
- ◆ $V_{DSS} = 650V$
- ◆ $R_{DS(ON)}$ typ. $2.15m\Omega @ V_{GS} = 18V$
- ◆ High speed switching with low capacitances
- ◆ Easy to parallel and simple to drive
- ◆ Pb Free & RoHS Compliant
- ◆ Electrically Isolation base plate



Dimensions in inches and (millimeters)

Applications

- ◆ Solar Inverters
- ◆ UPS
- ◆ Motor Drive
- ◆ Induction heating
- ◆ Switch Mode Power Supplies
- ◆ Battery Chargers
- ◆ DC/DC Converters



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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage (dynamic)	$V_{GS(max)}$	-10/+23	V
Gate-Source Voltage (static)	$V_{GS(OP)}$	-4/+18	V
Drain Current-Continuous	I_D	@ $T_c = 25^\circ C$ 1000 @ $T_c = 100^\circ C$ 600	A
Drain Current-Pulsed	I_{DM}	@ $T_c = 25^\circ C$ 2000	A
Maximum Power Dissipation	P_D	2500	W
Storage Temperature Range	T_{STG}	-40 to +125	$^\circ C$
Operating Junction Temperature Range	T_{VJ}	-40 to +175	$^\circ C$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.06	$^\circ C/W$
Isolation Voltage (A.C. 1 minute) between All Terminals and Baseplate	V_{iso}	2500	V
Mounting torque (M4 Screw)	M_d	1.3	N_m

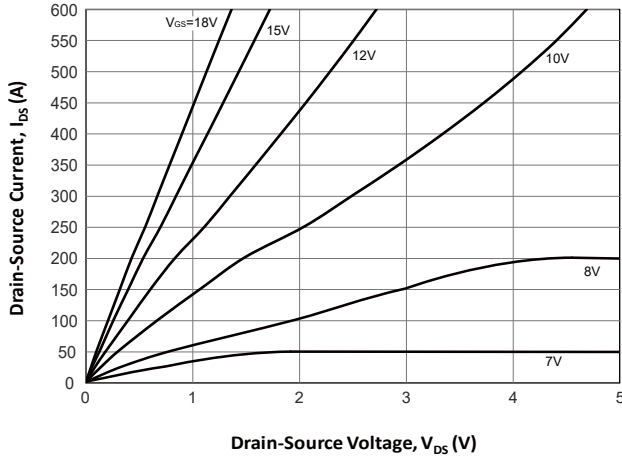
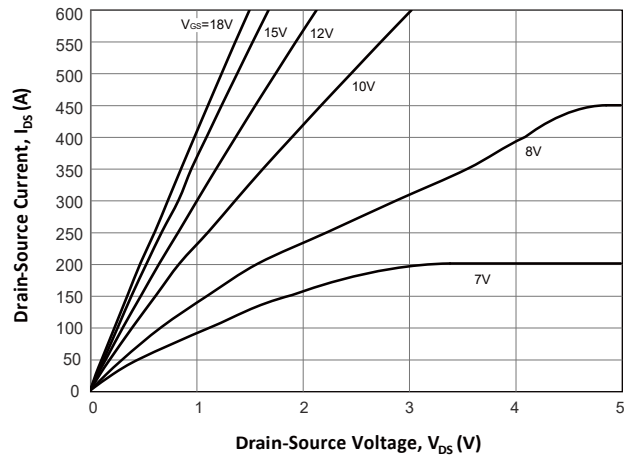
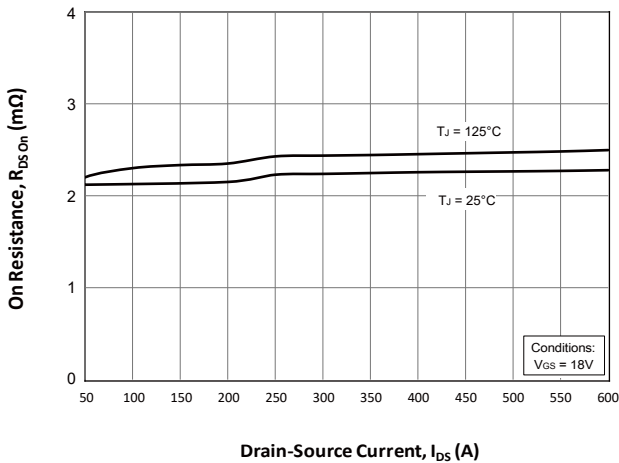
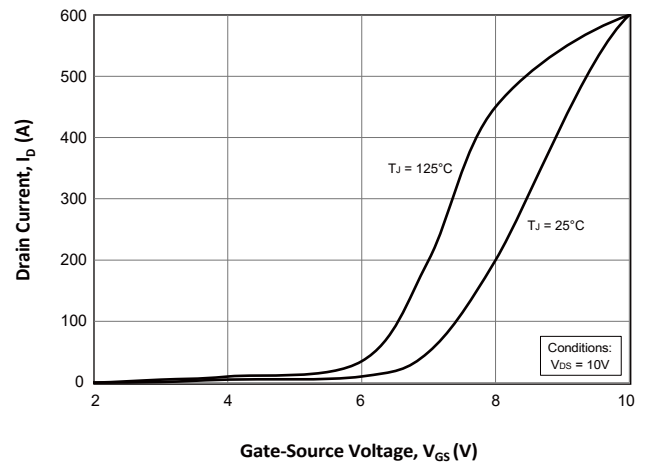
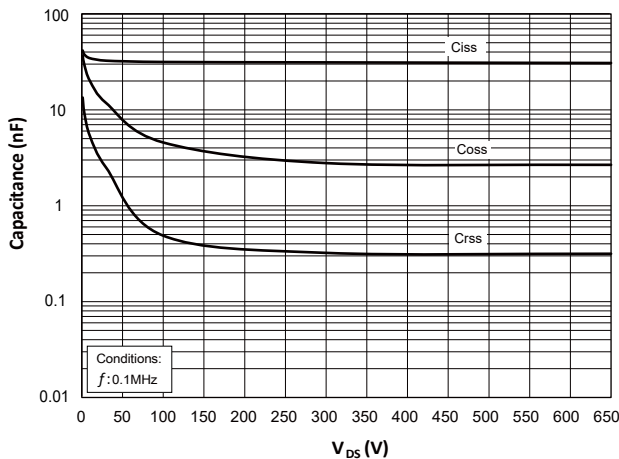
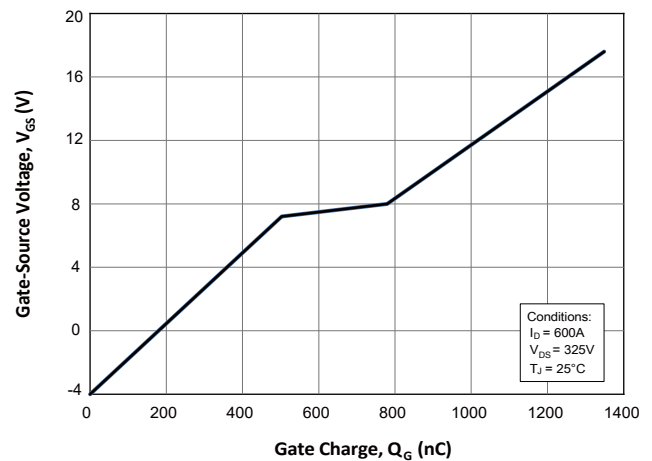
DIM	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.516	0.532	13.10	13.50
B	0.355	0.374	9.00	9.50
C	0.075	0.091	1.90	2.30
D	0.014	0.033	0.35	0.85
E	2.541	2.557	64.50	64.90
F	2.104	2.120	53.40	53.80
G	1.127	1.143	28.60	29.00
H	1.253	1.269	31.80	32.20
I	1.448	1.468	36.75	37.25
J	0.812	0.827	20.60	21.00
K	0.201	0.217	5.10	5.50
L	0.201	0.217	5.10	5.50
M	0.307	0.323	7.80	8.20
N	0.169	0.185	4.30	4.70
O	1.931	1.946	49.00	49.40
P	M4*8			

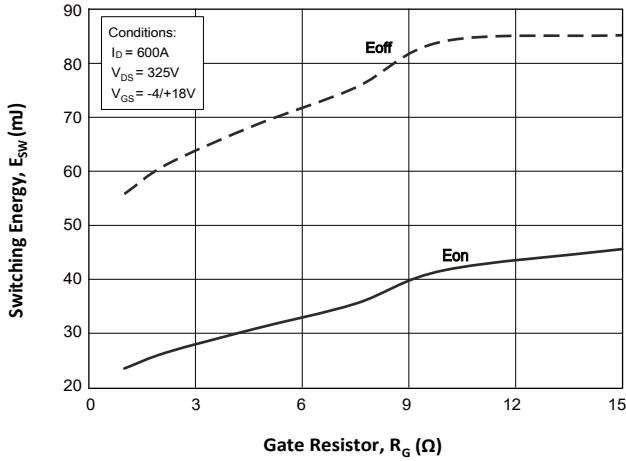
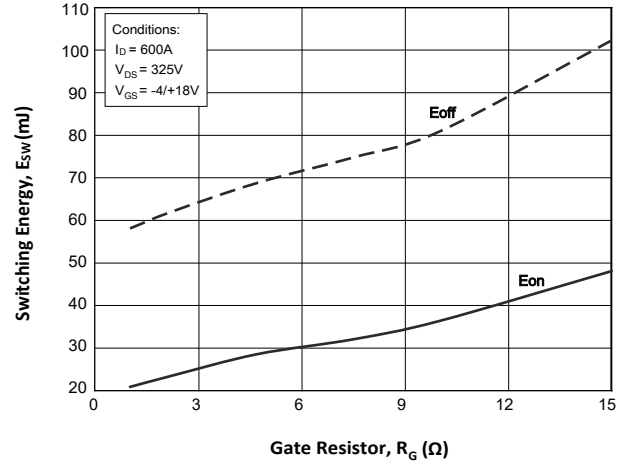
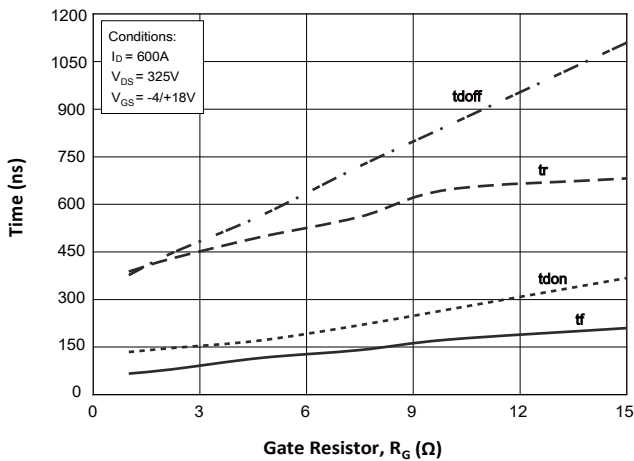
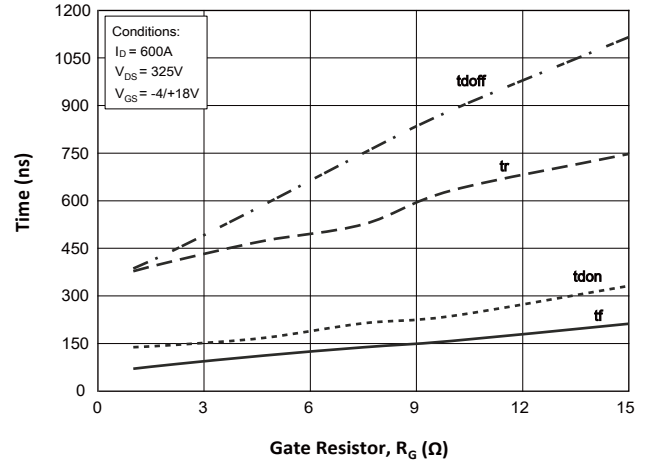
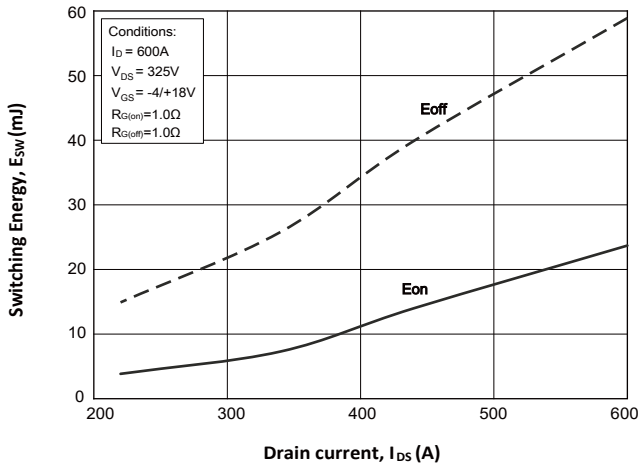
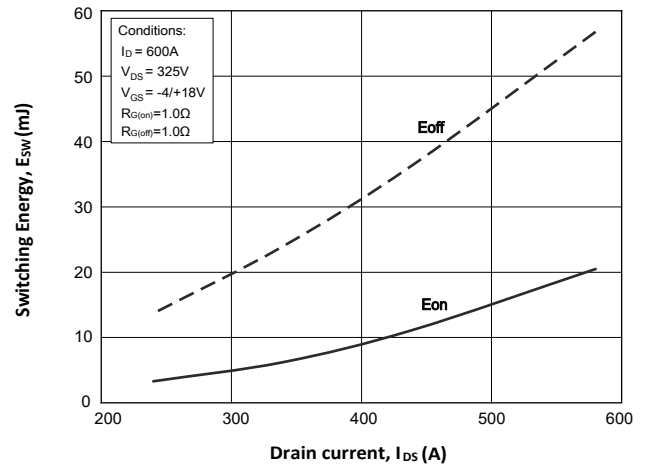
Electrical Characteristics @ $T_{VJ} = 25^{\circ}\text{C}$ (unless otherwise specified)

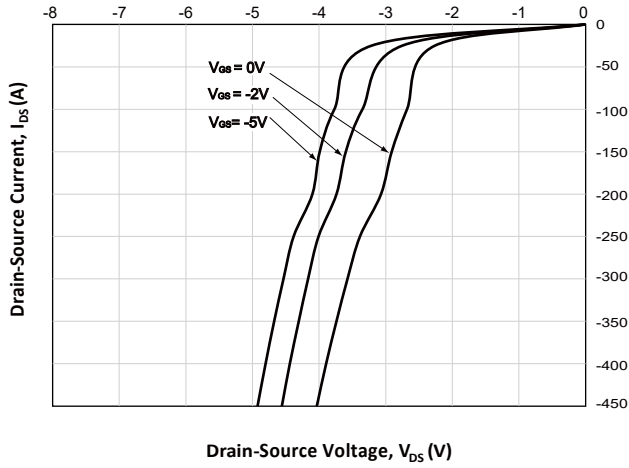
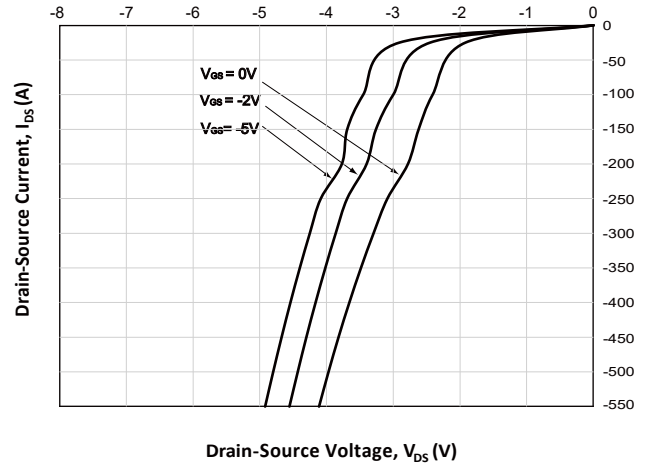
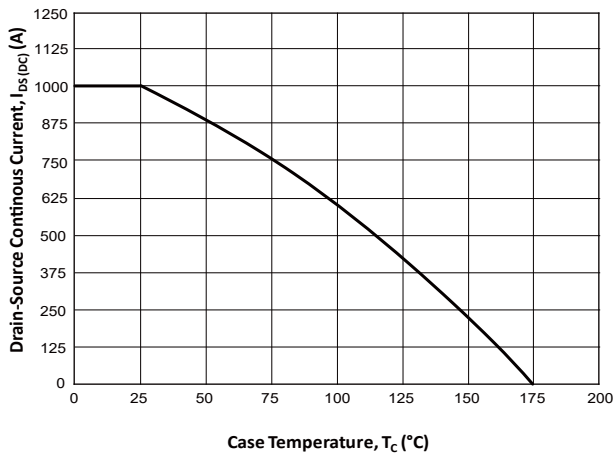
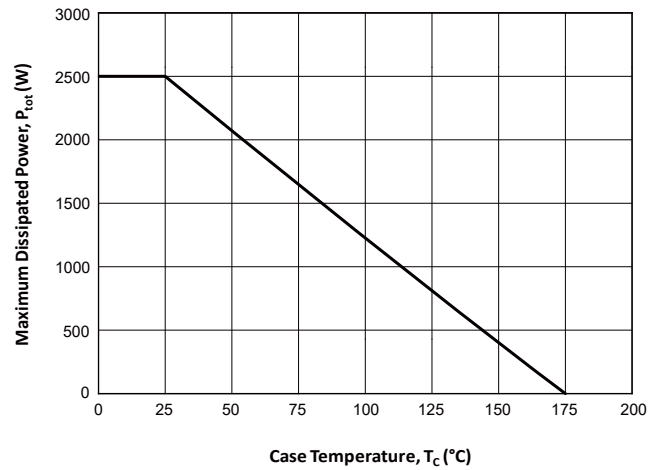
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
OFF Characteristics							
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_{DS}=0.5mA$	650	-	-	V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=650V$	-	-	200	μA	
Gate-Body Leakage	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	500	nA	
ON Characteristics							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=100mA$	2.1	3.0	4.2	V	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_{DS}=200A$	-	2.15	2.80	$m\Omega$	
Gate Resistance	$R_{G(int)}$	Internal gate resistor $T_{VJ} = 25^{\circ}\text{C}$	-	3.33	-	Ω	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS}=650V$ $V_{GS}=0V$	-	30.8	-	nF	
Output Capacitance	C_{oss}	$V_{AC}=1V$	-	2.66	-		
Reverse Transfer Capacitance	C_{riss}	Freq.=100KHz	-	0.315	-		
Total Gate Charge	Q_g	$V_{DS}=325V$ $V_{GS}=-4V/+18V$ $I_{DS}=600A$	-	1349	-	nC	
Gate to Source Charge	Q_{gs}		-	503	-		
Gate to Drain Charge	Q_{gd}		-	277	-		
Switching Characteristics							
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 325V$ $V_{GS} = -4V/+18V$ $I_{DS}=600A$ $R_{G(on)} = 1.0\Omega$ $R_{G(off)} = 1.0\Omega$	$T_{VJ} = 25^{\circ}\text{C}$	-	144	-	ns
			$T_{VJ} = 150^{\circ}\text{C}$	-	138	-	
Rise Time	t_r		$T_{VJ} = 25^{\circ}\text{C}$	-	480	-	
			$T_{VJ} = 150^{\circ}\text{C}$	-	378	-	
Turn-Off Delay Time	$t_{d(off)}$		$T_{VJ} = 25^{\circ}\text{C}$	-	327	-	
			$T_{VJ} = 150^{\circ}\text{C}$	-	386	-	
Fall Time	t_f		$T_{VJ} = 25^{\circ}\text{C}$	-	61	-	
			$T_{VJ} = 150^{\circ}\text{C}$	-	70	-	
Turn-On Switching Energy	E_{on}	$T_{VJ} = 25^{\circ}\text{C}$	-	28	-	mJ	
		$T_{VJ} = 150^{\circ}\text{C}$	-	21	-		
Turn-Off Switching Energy	E_{off}	$T_{VJ} = 25^{\circ}\text{C}$	-	50	-		
		$T_{VJ} = 150^{\circ}\text{C}$	-	58	-		
Body Diode Characteristics at $T_J = 25^{\circ}\text{C}$, unless otherwise specified							
Continuous Diode Fwd Current	I_{SDC}	$V_{GS} = 0V$	-	600	-	A	
Drain-Source Reverse Voltage	V_{SD}	$I_{SD} = 600A, V_{GS} = 0V$	-	4.4	-	V	
MOSFET Forward Recovery Charge	Q_{rr}	$V_{DD} = 325V$ $I_{DS} = 600A$ $V_{GS} = -4/+18V$ $di/dt = 1000 A/\mu s$	$T_{VJ} = 25^{\circ}\text{C}$	-	1684	-	nC
			$T_{VJ} = 150^{\circ}\text{C}$	-	1870	-	
MOSFET Peak Forward Recovery Current	I_{rrm}		$T_{VJ} = 25^{\circ}\text{C}$	-	32	-	A
			$T_{VJ} = 150^{\circ}\text{C}$	-	40	-	
MOSFET Reverse Recovery Time	T_{rr}		$T_{VJ} = 25^{\circ}\text{C}$	-	73	-	ns
			$T_{VJ} = 150^{\circ}\text{C}$	-	73	-	

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 $T_J=125^\circ\text{C}$

Fig.8 Switching losses vs R_G change $T_J=150^\circ\text{C}$

Fig.9 Switching Timer vs R_G Change $T_J=125^\circ\text{C}$

Fig.10 Switching Timer vs R_G Change $T_J=150^\circ\text{C}$

Fig.11 Clamped Inductive Switching Energy vs. Drain Current $T_J=125^\circ\text{C}$

Fig.12 Clamped Inductive Switching Energy vs. Drain Current $T_J=150^\circ\text{C}$


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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