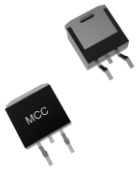
1200V N-Channel SiC MOSFET

Product Summary

Parameter	Rating
V_{DS}	1200V
I_D	13A
$R_{DS(on)}$ Max @V_{GS}=20V	320mΩ



D2-PAK

Features

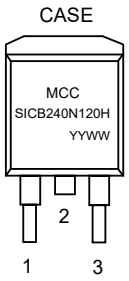
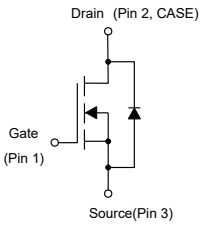
- Essentially no switching losses
- Fast switching speed

- Solar Inverters
- Uninterruptible Power Supply
- Photovoltaic Inverter
- Battery Chargers
- Motor Drives

Mechanical Data

- Package: D2-PAK package
- Moisture Sensitivity: Level 1, per J-STD-020
- Halogen Free. “Green” Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)
- Weight: 1.404g (approximate)

Body Marking and Pin Layout

Marking Code	Internal Structure
	

YY = Year Code
WW = Week Code

Ordering Information

Product Name	Packing info
SICB240N120H-TP	800pcs/reel

For packaging details, visit our website at https://www.mccsemi.com/Package/List

Maximum Ratings (T_J=25°C unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage (Note2)		V_{GS}	-10 / +25	V
Recommended Operation Gate-Source Voltage		$V_{GS(op)}$	-5 / +20	V
Continuons Drain Curent	T_C=25°C, V_{GS}=10V	I_D	13	A
	T_C=100°C, V_{GS}=10V		9	
Pulsed Drain Current (Note2)		I_{DM}	23	A
Total Power Dissipation(Note3)	T_C=25°C, V_{GS}=10V	P_D	100	W
	T_C=100°C, V_{GS}=10V		43	
Single Pulsed Avalanche Energy	T_J=25℃ , V_{DD}=75V, V_{GS}=xxV, L=xxmH, I_D=2.8A	E_{AS}	100	mJ
Operating Junction Temperature Range		T_J	-55 to +175	℃
Storage Temperature Range		T_{STG}	-55 to +175	℃

Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and 1000ppm antimony compounds.
2. AC f > 1Hz, duty cycle < 1%
3. Repetitive rating; pulse width limited by max. junction temperature

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance from Junction to Ambient (Note 3)	$R_{\theta JA}$	62	°C/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.5	°C/W

Note:

4. The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_A =25°C.

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=100μA	1200			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =±20V			250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 1200V, V_{GS}=0V		<1	50	μA
		V_{DS}= 1200V, V_{GS}=0V, T_J=175℃		10	500	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=5mA	1.5	2.6	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=20V, I_D=5A		240	330	mΩ
		V_{GS}=20V, I_D=5A, T_J=175℃		400		
Gate Resistance	R_g	F=1MHz, V_{AC}=25mV		4.2	7.0	Ω
Forward Transconductance	g_{FS}	V_{DS} = 20V, I_D=5A		3.9		S
Diode Characteristics						
Continuous Body Diode Current	I_S	V_{GS}=0V		15.5		A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=2.5A		3.7		V
Reverse Recovery Time	t_{rr}	V_{GS}=0V ,I_{SD}=2.5A, V_{DS}=800V dI$_F$/dt=300A/μs		47		ns
Reverse Recovery Charge	Q_{rr}			36		nC
Peak Reverse Recovery Current	I_{RRM}			1.5		A
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=800V, V_{GS}=0V, V_{AC}=25mV, f=1MHz		559		pF
Output Capacitance	C_{oss}			36		
Reverse Transfer Capacitance	C_{rss}			7.5		
Cross Stored Energy	E_{oss}			14		μJ
Total Gate Charge	Q_g	V_{DS}=800V, V_{GS}=-5/+20V, I_D=5A		47		nC
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			25		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=800V, V_{GS}=-5/+20V, R_G=2.7Ω, I_D=5A, L= 300μH		5.5		ns
Turn-On Rise Time	t_r			16		
Turn-Off Delay Time	$t_{d(off)}$			12.8		
Turn-Off Fall Time	t_f			20		
Turn-On Switching Energy	E_{on}	V_{DD}=800V, V_{GS}=-5/+20V, R_G=2.7Ω, I_D=5A, L= 300μH		108		μC
Turn-Off Switching Egergy	E_{off}			34		

Curve Characteristics(T_J=25℃ unless otherwise specified)

Fig. 1 - Typical Output Characteristic (T_j=25°C)

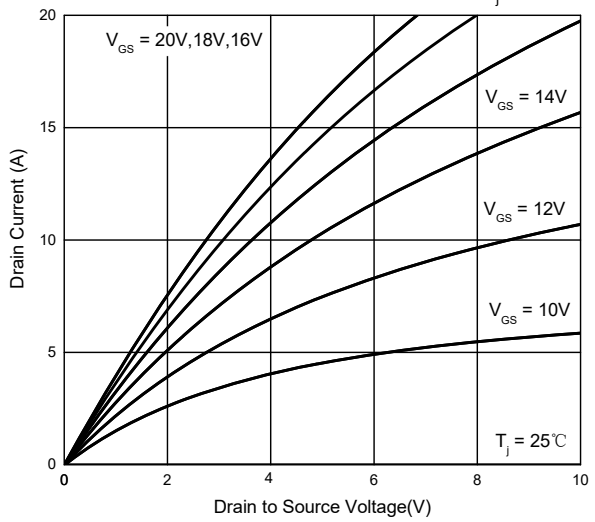


Fig. 2 - Typical Output Characteristic (T_j=175°C)

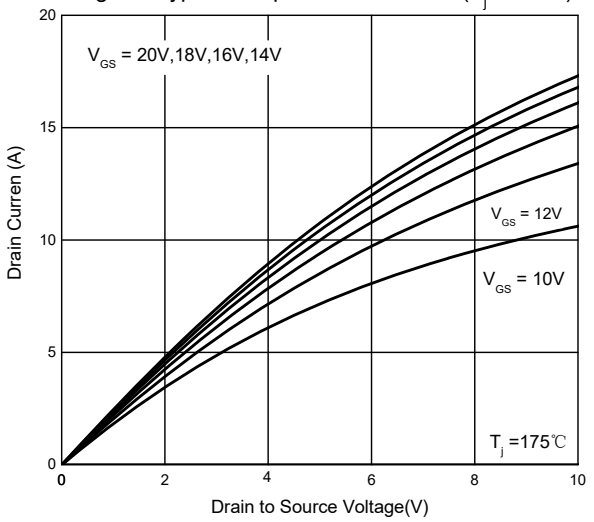


Fig. 3 -On-Resistance vs. Drain Current

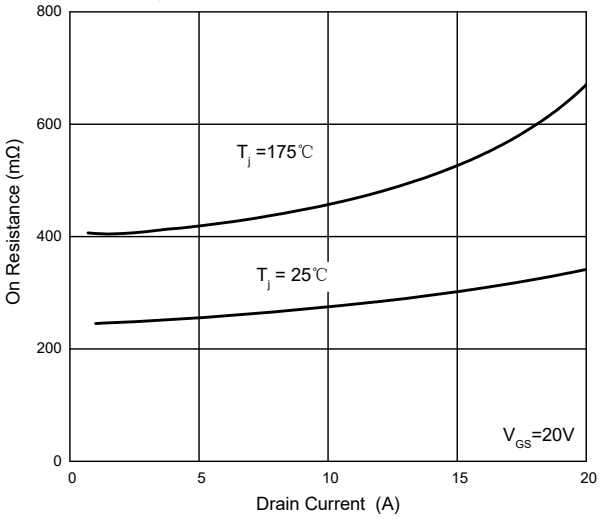


Fig. 4 - Typical Transfer Characteristic

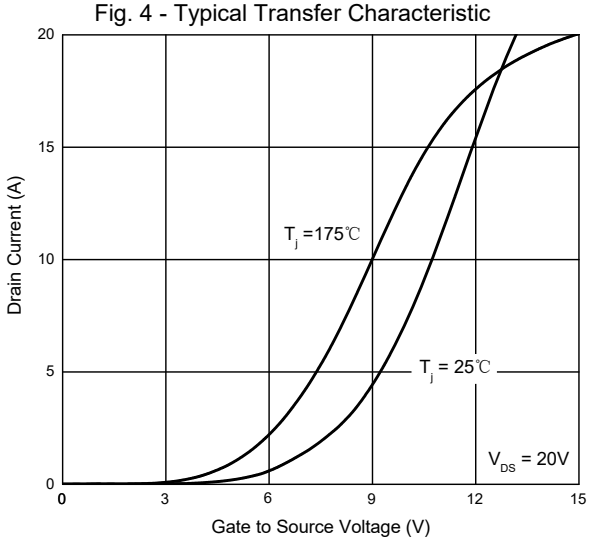


Fig. 5 - On-Resistance vs. Gate Voltage

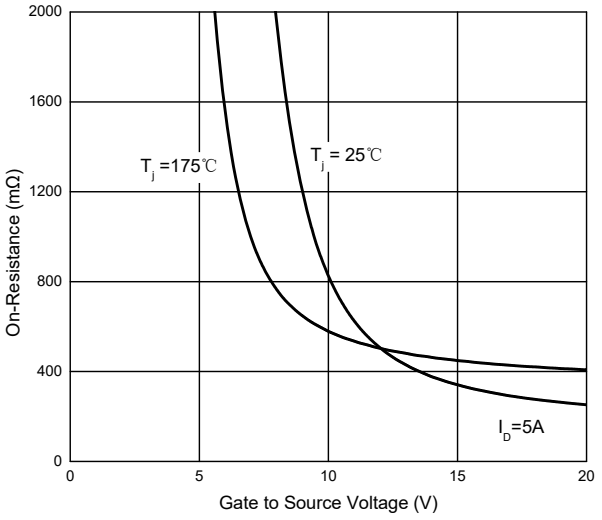
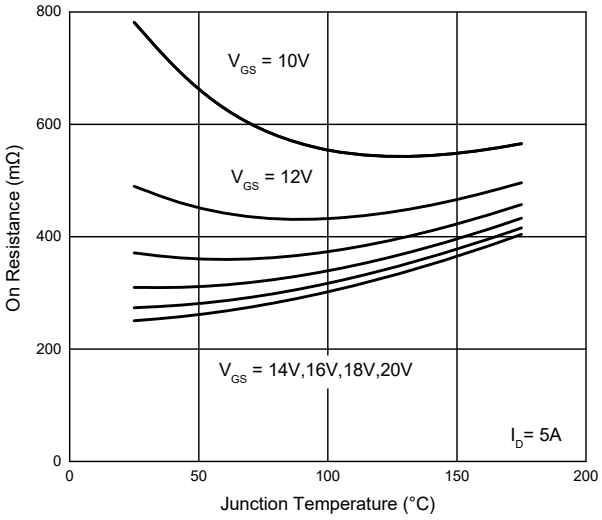


Fig. 6 - On-Resistance vs. Temperature



Curve Characteristics(T_J=25℃ unless otherwise specified)

Fig. 7 - Normalized On-Resistance vs. Temperature

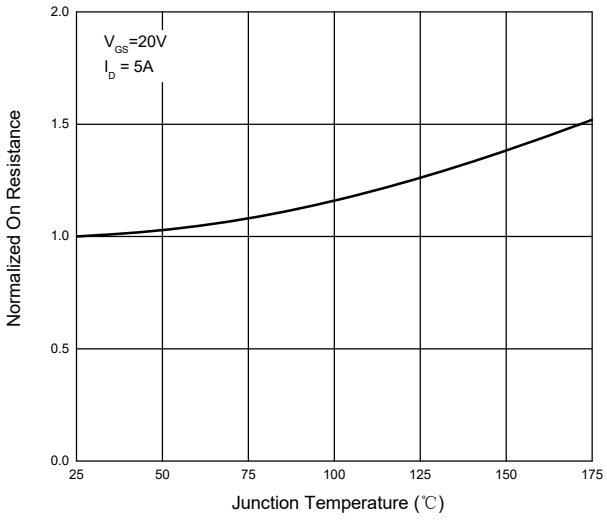


Fig. 8 - Reverse Output Voltage

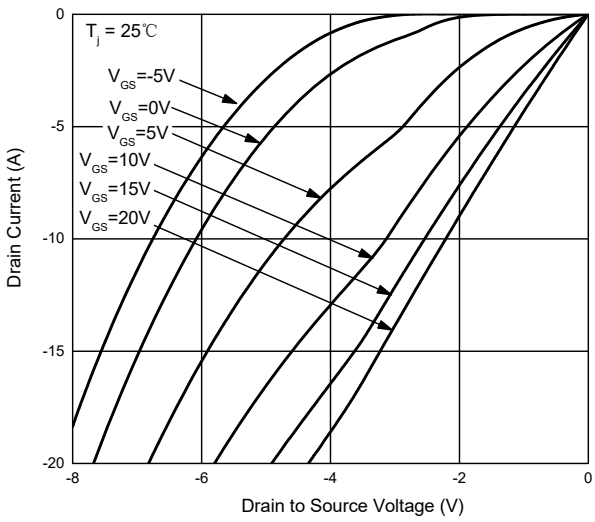


Fig. 9 - Reverse Output Voltage

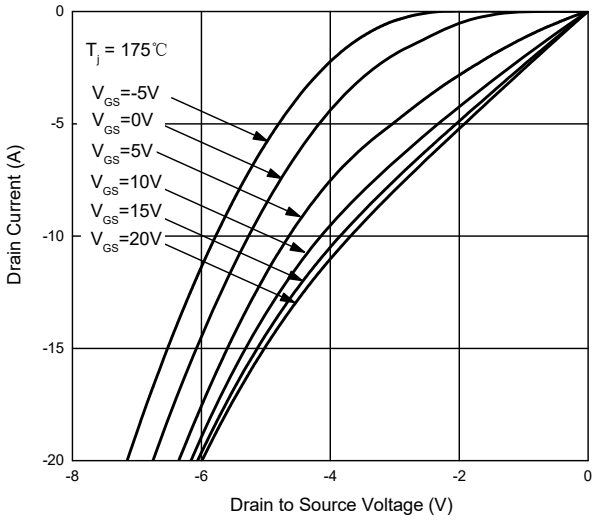


Fig. 10 - Capacitances vs. V_{DS}

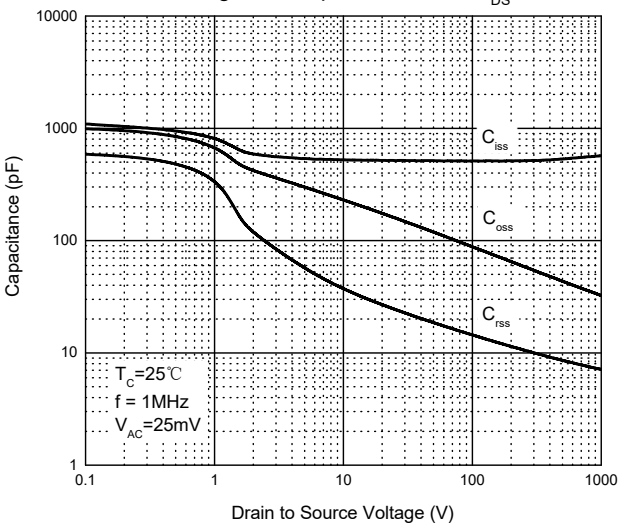


Fig. 11 - Threshold Voltage vs. Temperature

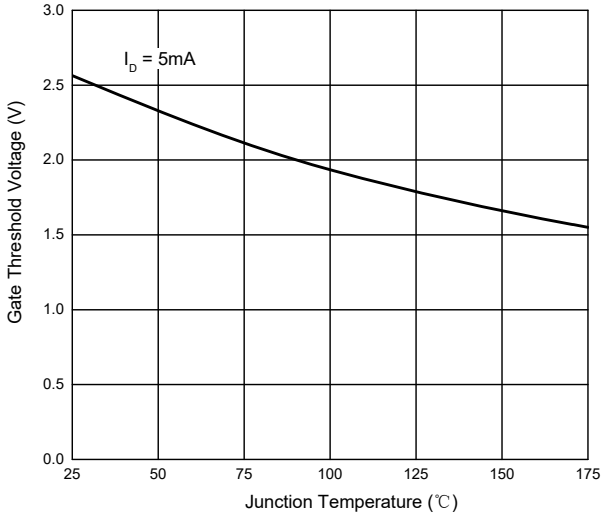
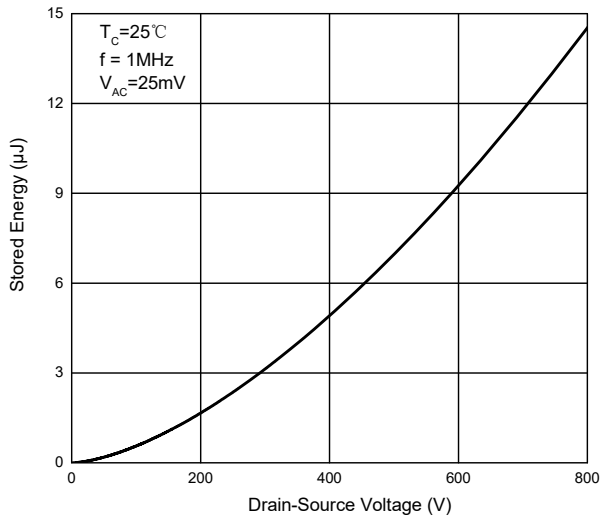


Fig. 12 - Output Capacitor Stored Energy



Curve Characteristics(T_J=25℃ unless otherwise specified)

Fig. 7 - Normalized On-Resistance vs. Temperature

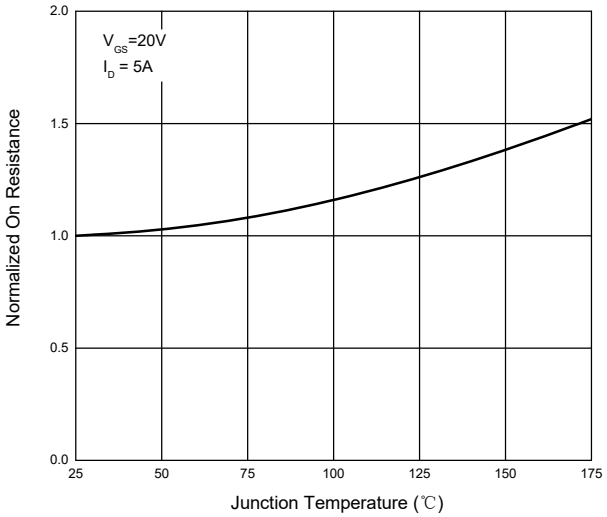


Fig. 8 - Reverse Output Voltage

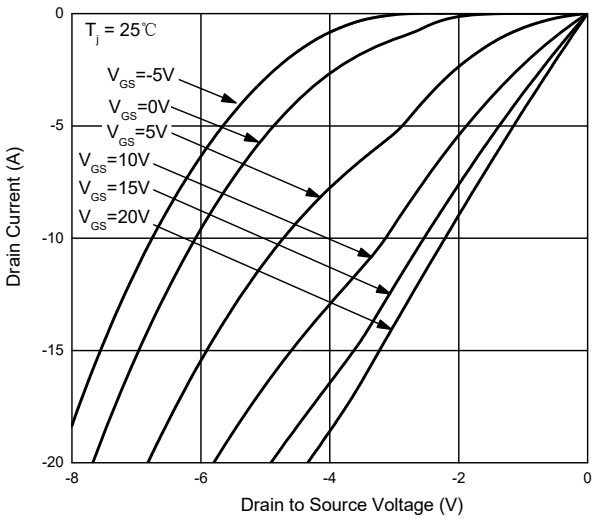


Fig. 9 - Reverse Output Voltage

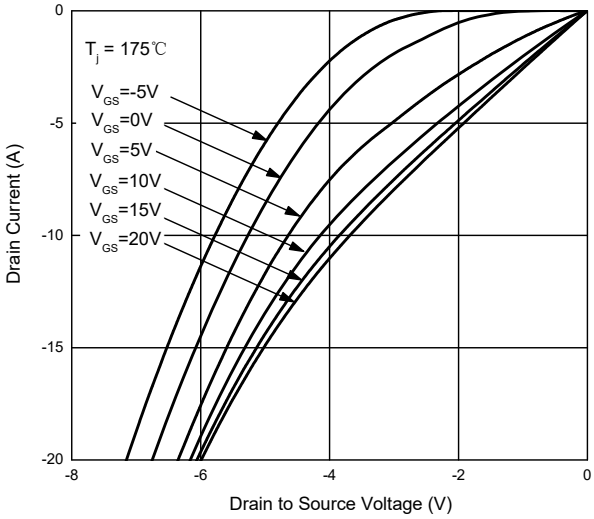


Fig. 10 - Capacitances vs. V_{DS}

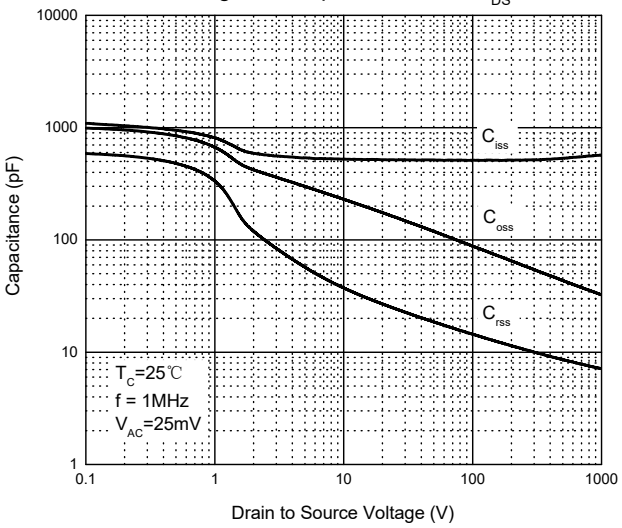


Fig. 11 - Threshold Voltage vs. Temperature

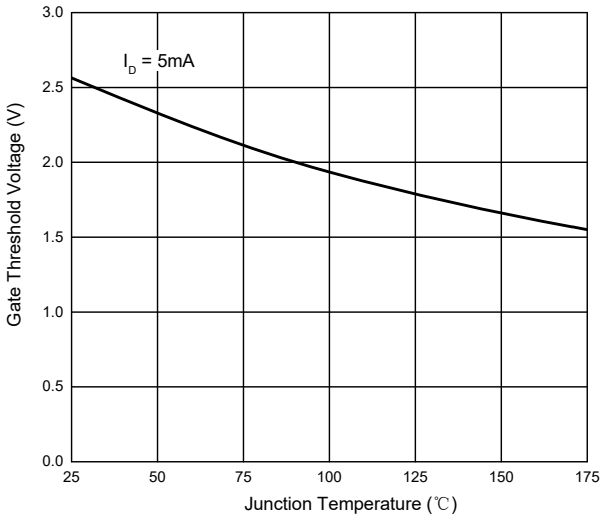
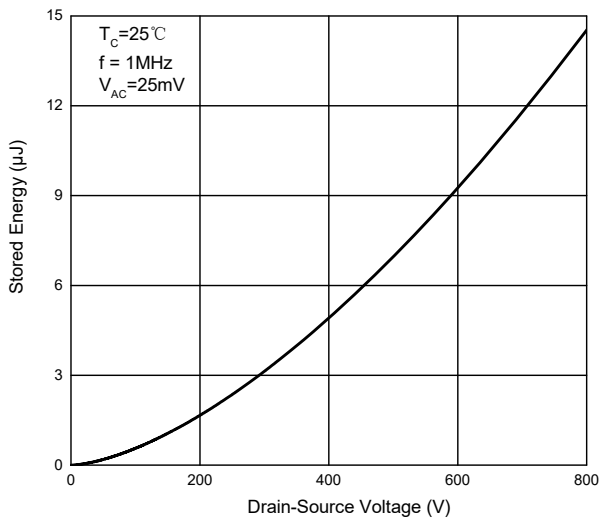
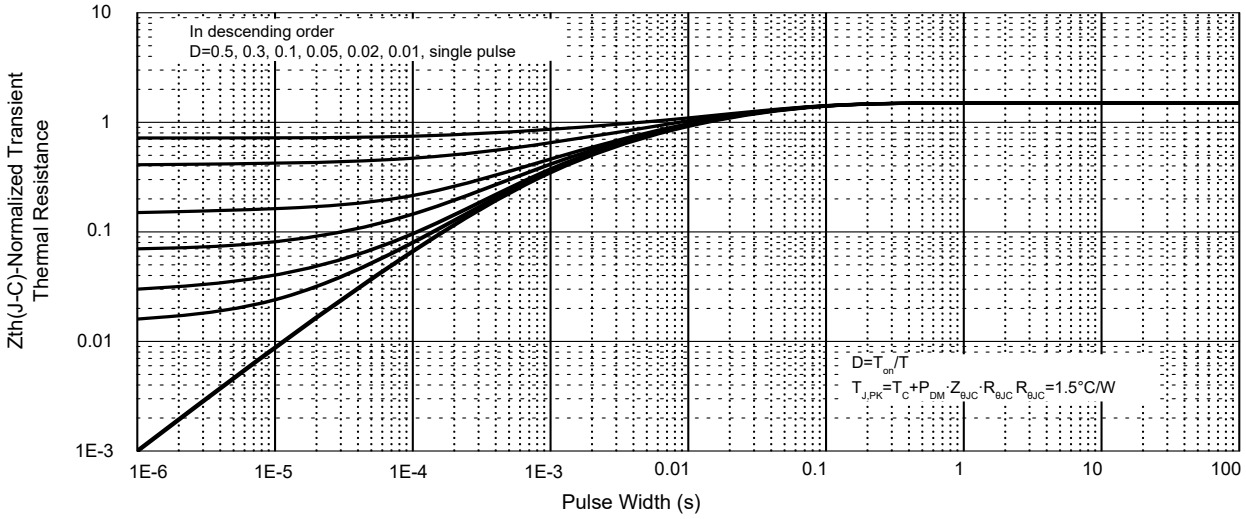


Fig. 12 - Output Capacitor Stored Energy

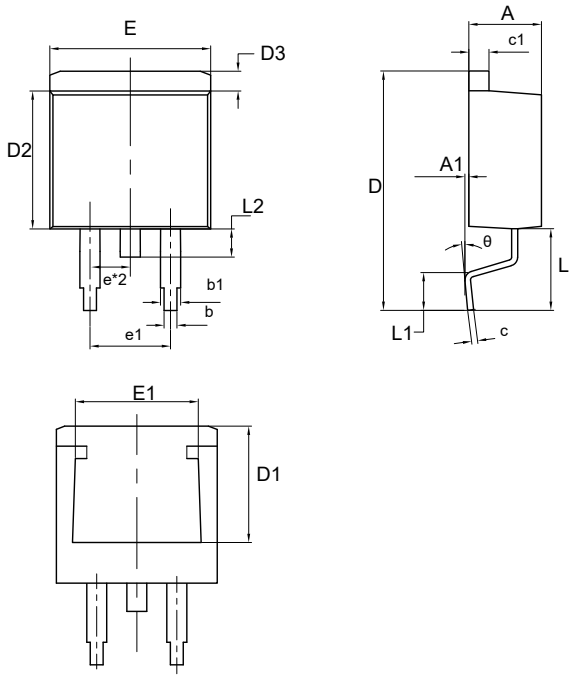


Curve Characteristics(T_J=25℃ unless otherwise specified)

Fig. 19 - Normalized Transient Thermal Impedance

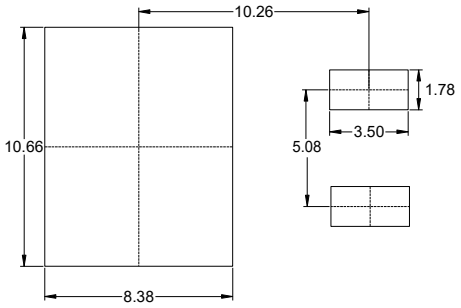


Package Outline



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.165	0.189	4.20	4.80	
A1	0.000	0.010	0.00	0.25	
b	0.027	0.037	0.68	0.94	
b1	0.041	0.057	1.05	1.45	
c	0.011	0.025	0.28	0.64	
c1	0.045	0.055	1.14	1.40	
D	0.575	0.625	14.60	15.87	
D1	0.259		6.60		
D2	0.331	0.370	8.40	9.40	
D3	0.042	0.058	1.07	1.47	
E	0.378	0.417	9.60	10.60	
E1	0.244		6.20		
e	0.100		2.54		BSC
e1	0.200		5.08		BSC
H	0.096	0.134	2.43	3.40	
L	0.196		5.00		REF
L1	0.071	0.131	1.80	3.32	
L2		0.070		1.80	
θ	0°	8°	0°	8°	

Suggested Pad Layout (Unit:mm)



Notes:

1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please reference document IPC-7351A.

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