

Features

- SiC MOSFET Technology
- High Blocking Voltage with Low On-resistance
- Avalanche Ruggedness
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note2)("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 0.4°C/W Junction to Case

Applications

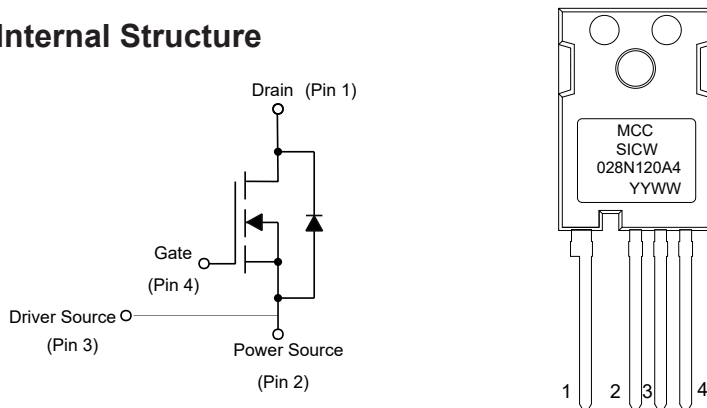
- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage		V_{GSmax}	-5/+22	V
Gate-Source Voltage		V_{GSop}	-3/+18	V
Continuous Drain Current $V_{GS}=18V$	$T_C=25^{\circ}C$	I_D	80	A
	$T_C=110^{\circ}C$		52	
Pulsed Drain Current (Note 3)		I_{DM}	320	A
Single Pulse Avalanche Energy (Note4)		E_{AS}	1620	mJ
Total Power Dissipation	$T_C=25^{\circ}C$	P_D	375	W
	$T_C=110^{\circ}C$		162	

Notes:

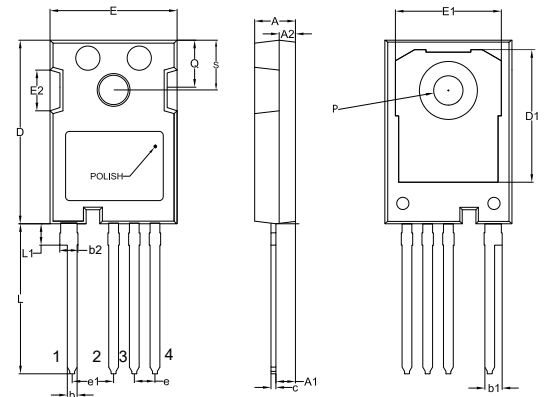
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
3. Pulse Test: Pulse Width Limited by T_{jmax} .
4. EAS Condition: Starting $T_j=25^{\circ}C$, $V_{DD}=50V$, $V_{GS}=20V$, $R_g=25\Omega$, $L=10mH$.

Internal Structure



N-CHANNEL MOSFET

TO-247-4



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.190	0.205	4.80	5.20	
A1	0.090	0.100	2.29	2.50	
A2	0.075	0.082	1.88	2.08	
b	0.042	0.052	1.10	1.36	
b1	0.093	0.108	2.35	2.75	
b2	0.094	0.112	2.39	2.84	
c	0.022	0.027	0.55	0.70	
D	0.917	0.929	23.30	23.60	
D1	0.640	0.663	16.25	16.85	
E	0.620	0.632	15.75	16.05	
E1	0.543	0.559	13.80	14.20	
E2	0.173	0.201	4.4	5.10	
e	0.100		2.54		
L	0.683	0.695	17.34	17.64	
L1	0.157	0.169	4.0	4.3	
P	0.138	0.144	3.51	3.75	Φ
Q	0.220	0.236	5.60	6.00	
S	0.238	0.248	5.60	6.30	

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 =250uA	1200			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} = -5/+22V			±250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V			100	μA
Gate-Threshold Voltage ^(Note5)	V _{GS(th)}	V _{DS} =V _{GS} , I _D =15mA	1.5	2.0	3.0	V
Drain-Source On-Resistance ^(Note5)	R _{DS(on)}	V _{GS} =20V, I _D =40A		26	30	mΩ
		V _{GS} =18V, I _D =40A		28	35	mΩ
		V _{GS} =16V, I _D =40A		32	40	mΩ
Internal Gate Resistance	R _g	f=1MHz, V _{AC} =25mV		1.5		Ω
Diode Characteristics						
Continuous Body Diode Current ^(Note6)	I _S	V _{GS} =-3V		72		A
Diode Forward Voltage ^(Note5)	V _{SD}	V _{GS} =-3V, I _{SD} =40A		4.5		v
Reverse Recovery Time	t _{rr}	V _{GS} =-3/+18V, I _{SD} =40A, V _R =800V, dI _F /dt=400A/μs		72		ns
Reverse Recovery Charge	Q _{rr}			240		nC
Peak Reverse Recovery Current	I _{rrm}			6.2		A
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =1000V, V _{GS} =0V, f=1MHz V _{AC} =25mV		3570		pF
Output Capacitance	C _{oss}			170		
Reverse Transfer Capacitance	C _{rss}			18		
Coss Stored Energy	E _{oss}			97		μJ
Total Gate Charge	Q _g	V _{DS} =800V, V _{GS} =-3/+18V I _D =40A		168		nC
Gate-Source Charge	Q _{gs}			35		
Gate-Drain Charge	Q _{gd}			53		
Gate Plateau Voltage	V _{pl}			7.1		V
Turn-On Delay Time	t _{d(on)}	V _{DD} =800V, V _{GS} =-3/+18V, R _{G(ext)} =2.5Ω, I _{DS} =40A, L=200μH		14		ns
Turn-On Rise Time	t _r			13		
Turn-Off Delay Time	t _{d(off)}			42.5		
Turn-Off Fall Time	t _f			11		
Turn-On switching energy	E _{on}				223	
Turn-Off switching energy	E _{off}			257		

Notes:

5. Pulse test, pulse width ≤ 380μs.

6. Limited by maximum power dissipation allowed.

Curve Characteristics

Fig. 1 - Typical Output Characteristic($T_J=25^\circ\text{C}$)

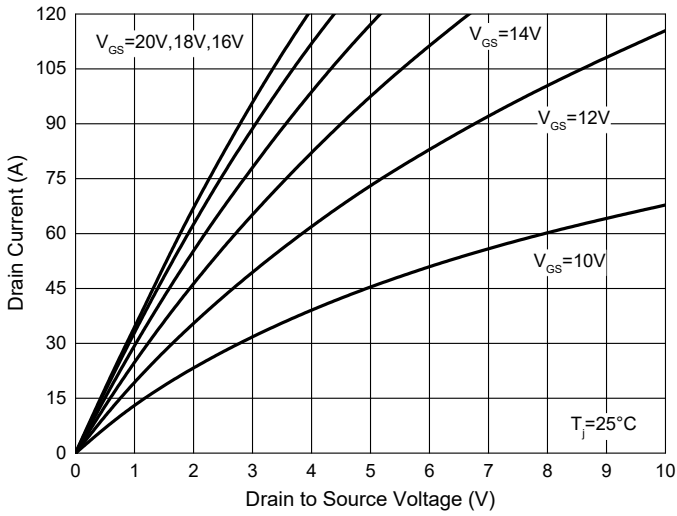


Fig. 2 - Typical Output Characteristic ($T_J=175^\circ\text{C}$)

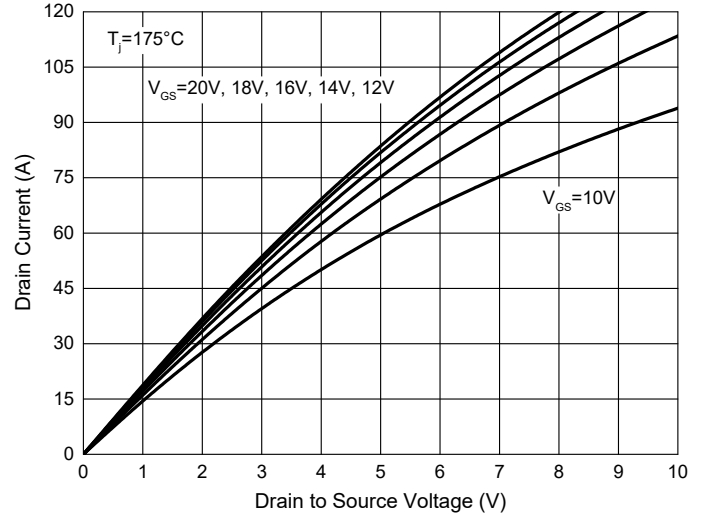


Fig. 3 - Typical Transfer Characteristic

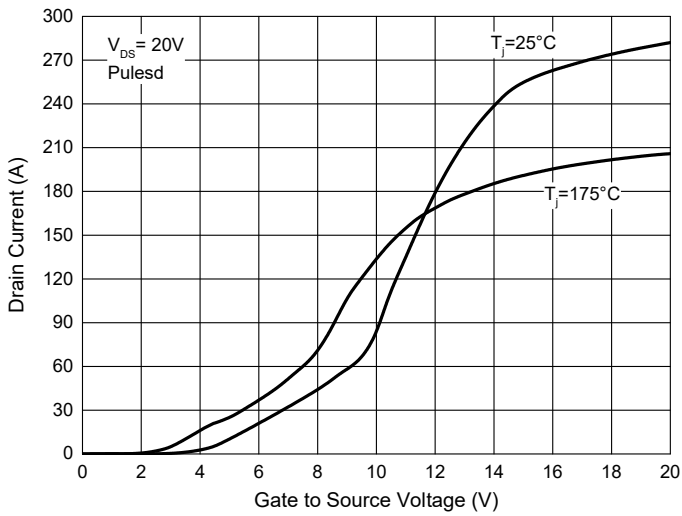


Fig. 4 - On-Resistance vs. Drain Current

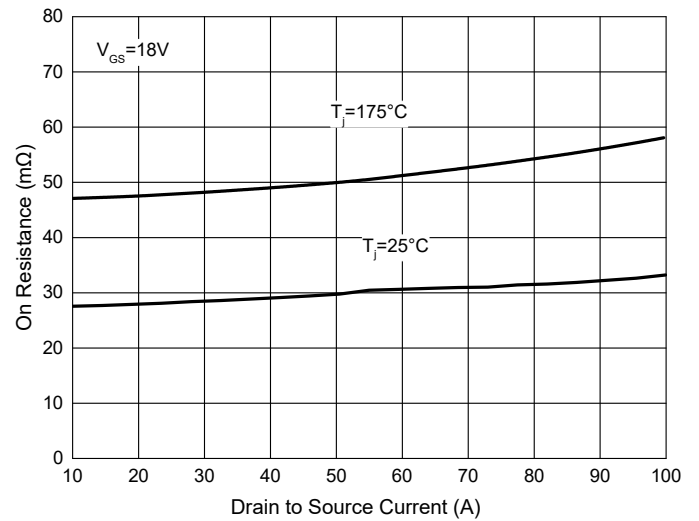


Fig. 5 On-Resistance vs Gate Voltage

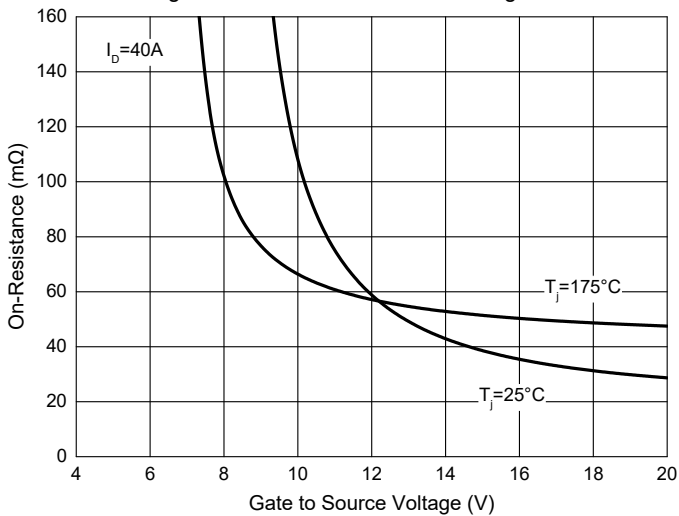
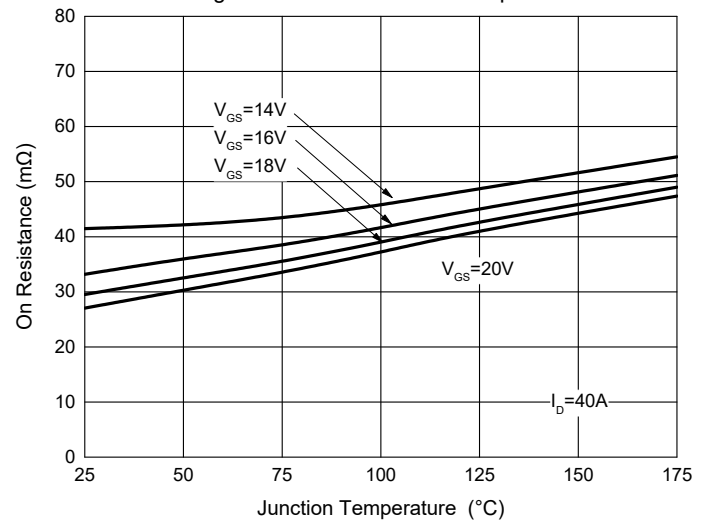


Fig. 6 - On-Resistance vs Temperature



Curve Characteristics

Fig. 7 - Normalized On-Resistance vs Temperature

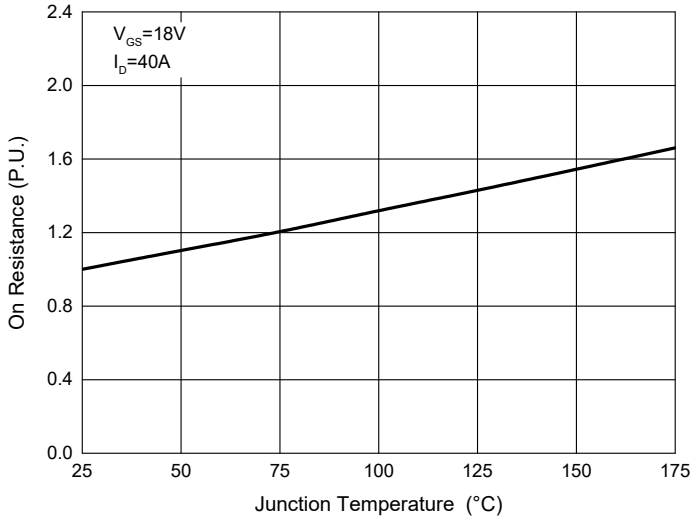


Fig. 8 - Body Diode Characteristic

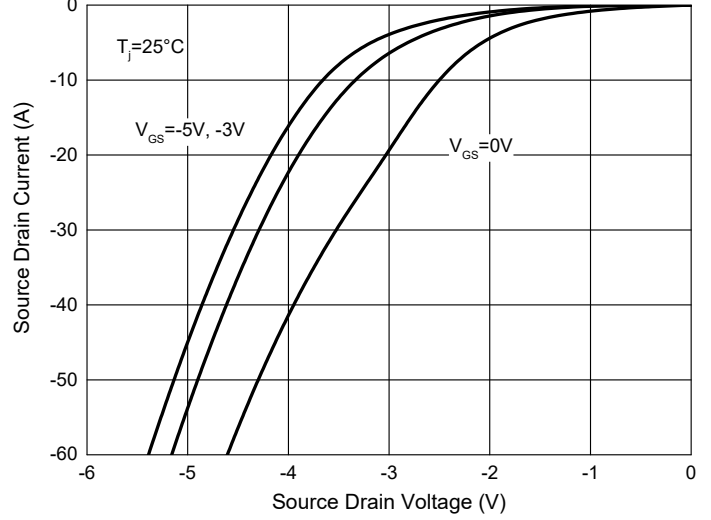


Fig. 9 - Body Diode Characteristic

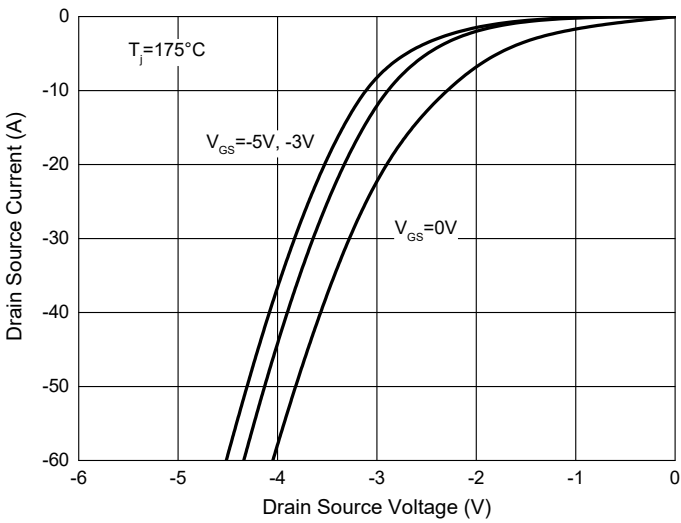


Fig. 10 - Output capacitor stored energy

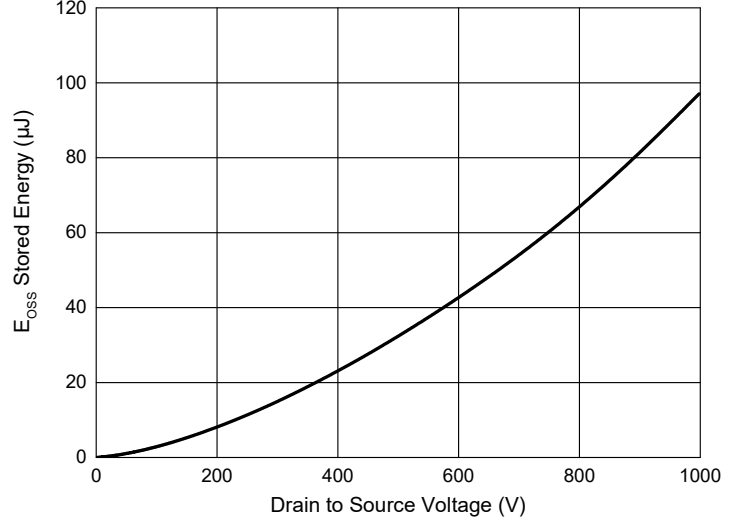


Fig. 11 - Threshold Voltage vs Temperature

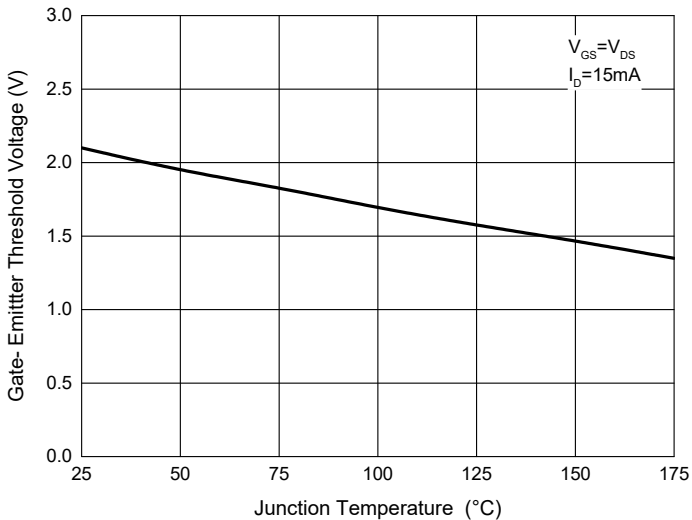
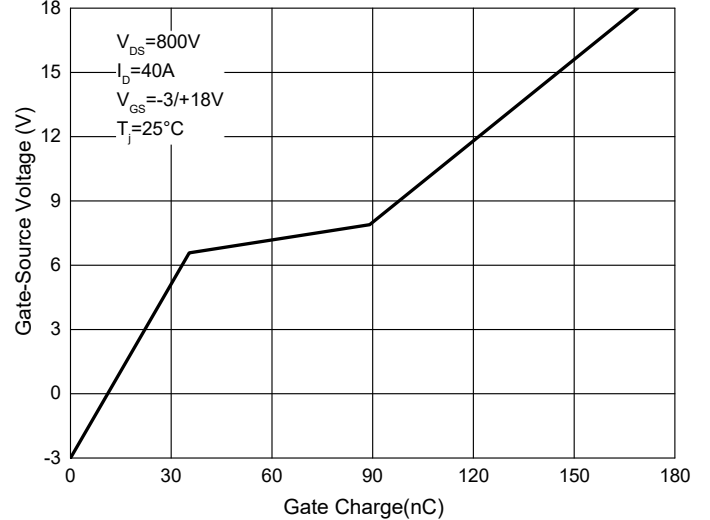


Fig. 12 - Typical Gate Charge



Curve Characteristics

Fig. 13 - Capacitance Characteristics

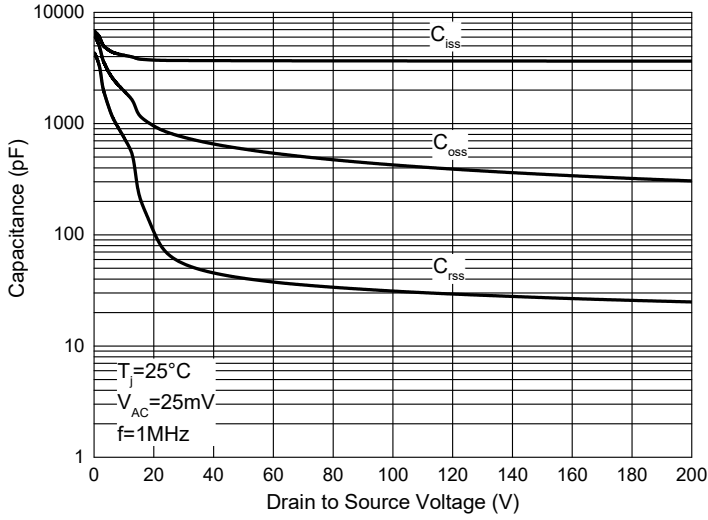


Fig. 14 - Capacitance Characteristics

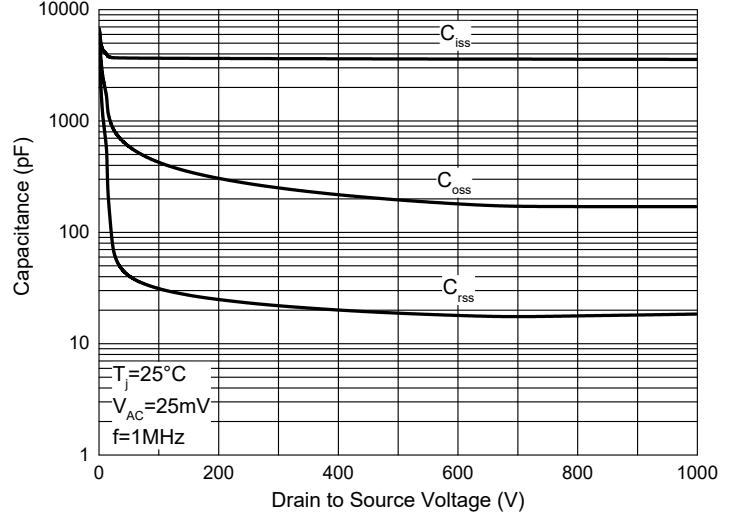


Fig. 15 - Drain Current Derating vs Case Temperature

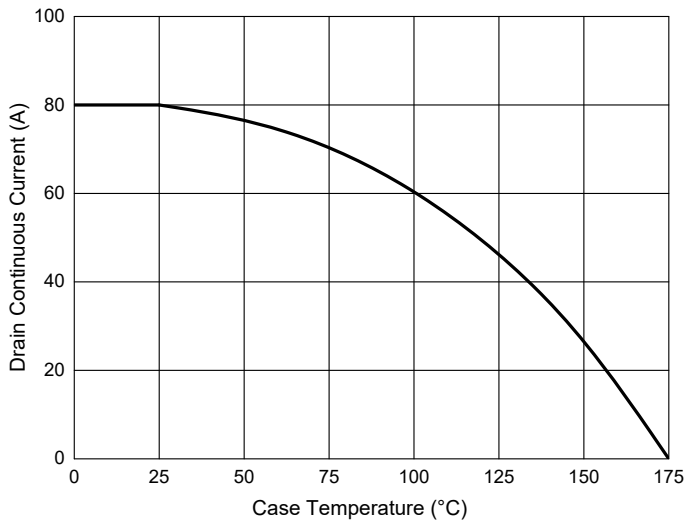


Fig. 16 - Normalized Transient Thermal Impedance

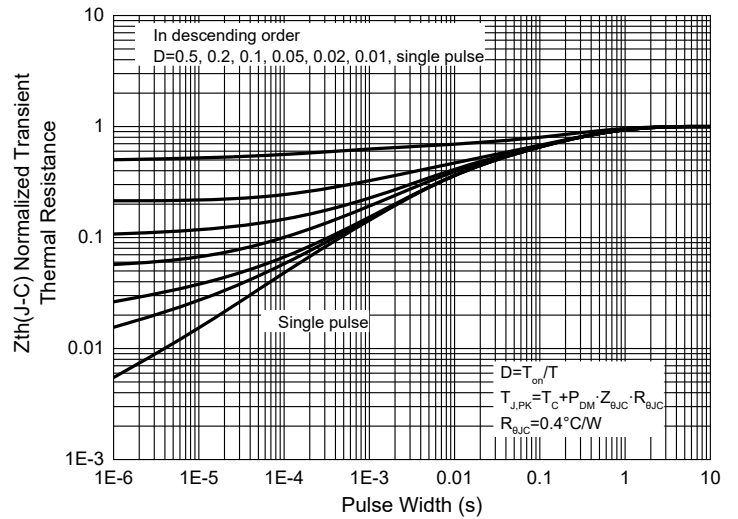


Fig. 17 - Safe Operation Area

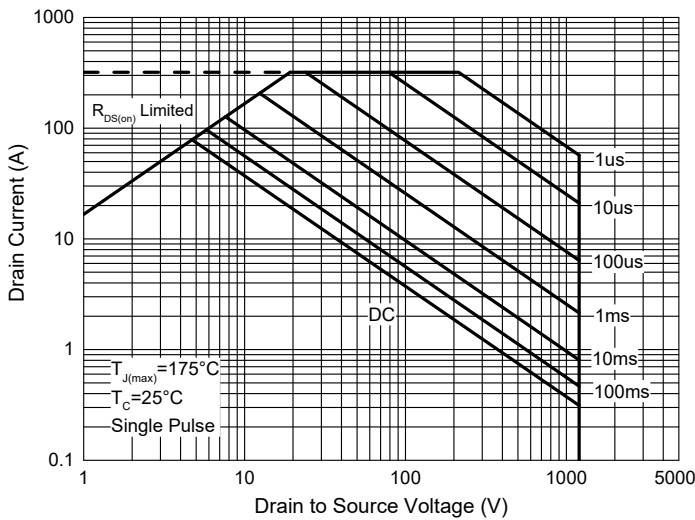
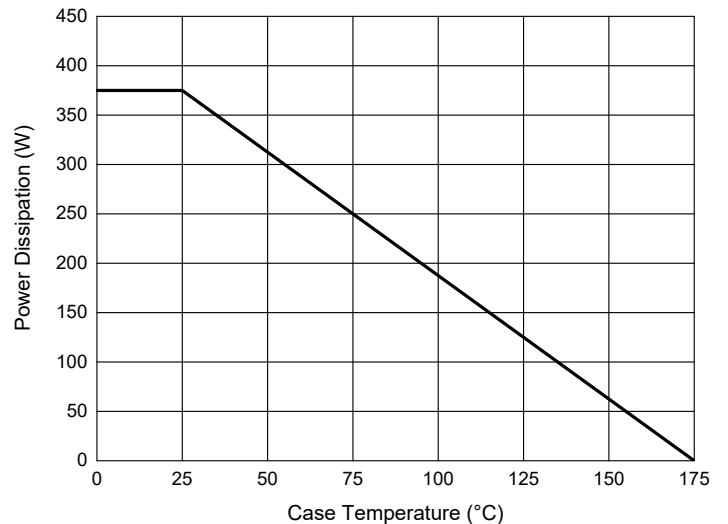


Fig. 18 - Power Derating



Ordering Information

Device	Packing
SICW028N120A4-BP	Tube:30pcs/Tube, 1.8K/Ctn;

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[G3R40MT12J](#)