

Features

- SiC MOSFET Technology
- High Blocking Voltage with Low On-resistance
- Low Capacitance
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note 2)(“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
- Typical Thermal Resistance: 1.55°C/W Junction to Case

Applications

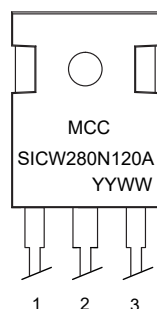
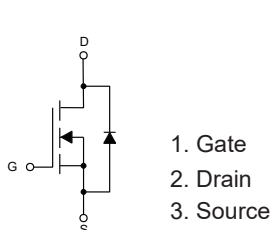
- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Power Factor Correction (PFC)
- Motor Drives

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 $V_{GS}=18V$	I_D	$T_c=25^{\circ}C$	10	A
		$T_c=100^{\circ}C$	7.6	
Pulsed Drain Current (Note 3)	I_{DM}	40	A	
Single Pulse Avalanche Energy (Note4)	E_{AS}	65	mJ	
Total Power Dissipation	P_D	$T_c=25^{\circ}C$	97	W
		$T_c=110^{\circ}C$	42	

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. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
3. Pulse Test: Pulse Width Limited by T_{jmax} .
4. EAS Condition: $T_j=25^{\circ}C$, $V_{DD}=50V$, $V_{GS}=20V$, $R_g=25\Omega$, $L=10mH$, $I_{AS}=3.6A$.

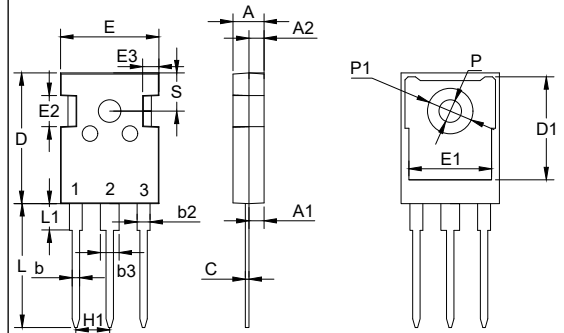
Internal Structure



Device Code: SICW280N120A
Date Code: YYWW (Year & Week)

**N-CHANNEL
MOSFET**

TO-247AB



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.189	0.205	4.80	5.20	
A1	0.087	0.103	2.21	2.61	
A2	0.073	0.085	1.85	2.15	
b	0.039	0.055	1.00	1.40	
b2	0.075	0.087	1.91	2.21	
C	0.020	0.028	0.50	0.70	
D	0.815	0.839	20.70	21.30	
D1	0.640	0.663	16.25	16.85	
E	0.610	0.634	15.50	16.10	
E1	0.512	0.535	13.00	13.60	
E2	0.189	0.205	4.80	5.20	
E3	0.091	0.106	2.30	2.70	
L	0.772	0.796	19.62	20.22	
L1	-	0.169	-	4.50	
P	0.134	0.150	3.40	3.80	Φ
P1		0.287	-	7.30	Φ
S	0.242		6.15		TYP
H1	0.214		5.44		TYP
b3	0.110	0.126	2.80	3.20	

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	1200			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=-5/+22V$			±250	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=1200V, V_{GS}=0V$			10	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=1mA$	1.5		3.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=20V, I_D=5A$		250	330	mΩ
		$V_{GS}=18V, I_D=5A$		280	360	mΩ
		$V_{GS}=16V, I_D=5A$		318	450	mΩ
Internal Gate Resistance	R_g	f=1MHz		7.6		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S	$V_{GS}=-3V$		10		A
Diode Forward Voltage	V_{SD}	$V_{GS}=-5V, I_{SD}=5A$		4.4		V
Reverse Recovery Time	t_{rr}	$V_{GS}=-3/+18V, I_{SD}=5A,$ $V_R=800V, di_F/dt=800A/\mu s$		26		ns
Reverse Recovery Charge	Q_{rr}		57		nC	
Peak Reverse Recovery Current	I_{rrm}		5.1		A	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=1000V, V_{GS}=0V, f=1MHz$ $V_{AC}=25mV$		357		pF
Output Capacitance	C_{oss}		22			
Reverse Transfer Capacitance	C_{rss}		3.7			
Coss Stored Energy	E_{oss}		13		μJ	
Total Gate Charge	Q_g	$V_{DS}=800V, V_{GS}=-3/+18V$ $I_D=5A$		26		nC
Gate-Source Charge	Q_{gs}		4			
Gate-Drain Charge	Q_{gd}		18			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=800V, V_{GS}=-3/+18V,$ $R_{G(ext)}=2.5\Omega, I_{DS}=5A, L=600\mu H$		6		ns
Turn-On Rise Time	t_r			14		
Turn-Off Delay Time	$t_{d(off)}$			11.5		
Turn-Off Fall Time	t_f			29		
Turn-On switching energy	E_{on}			94		μJ
Turn-Off switching energy	E_{off}			3		

Curve Characteristics

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

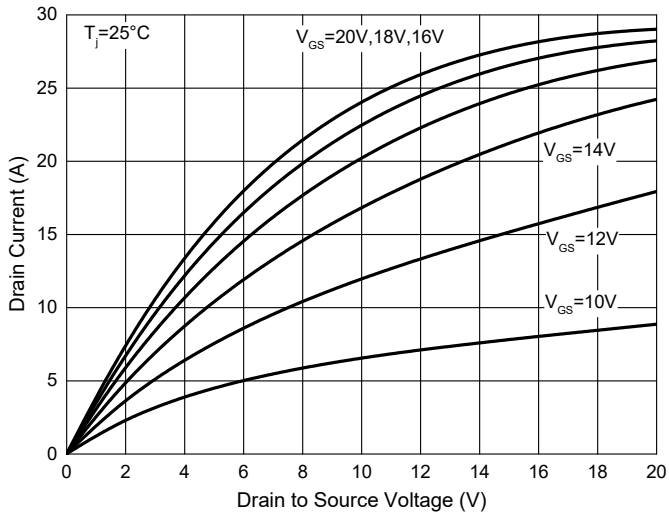


Fig. 2 - Typical Output Characteristic ($T_J=175^\circ\text{C}$)

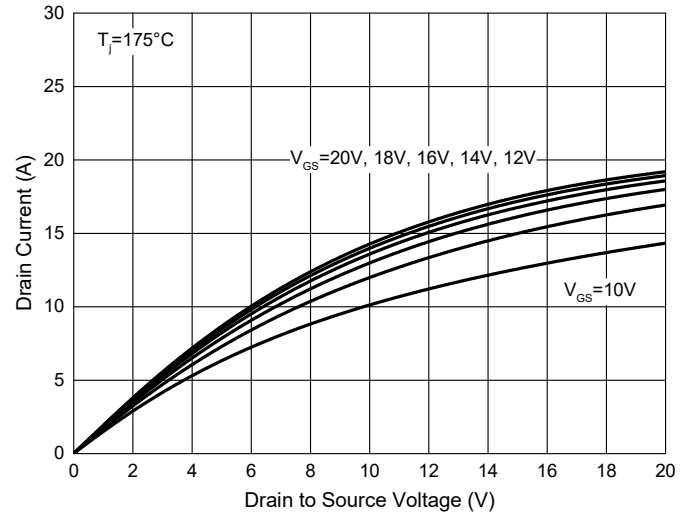


Fig. 3 - Typical Transfer Characteristic

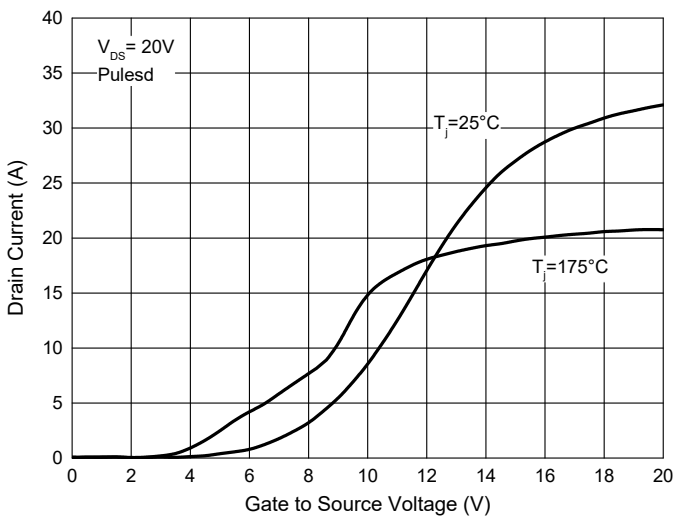


Fig. 4 - On-Resistance vs. Drain Current

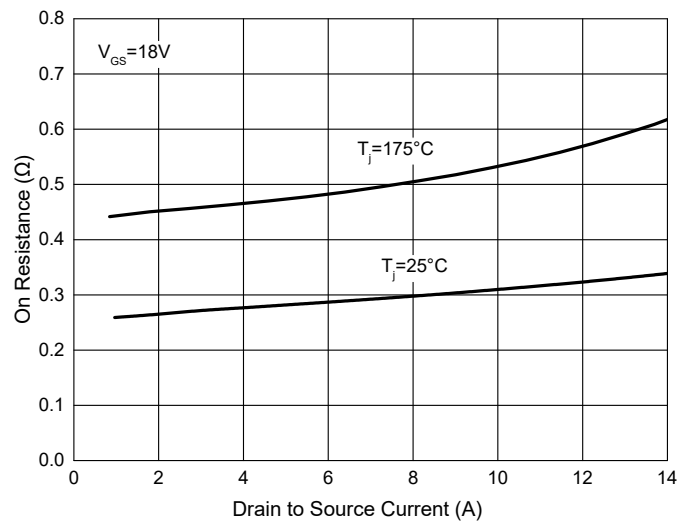


Fig. 5 On-Resistance vs Gate Voltage

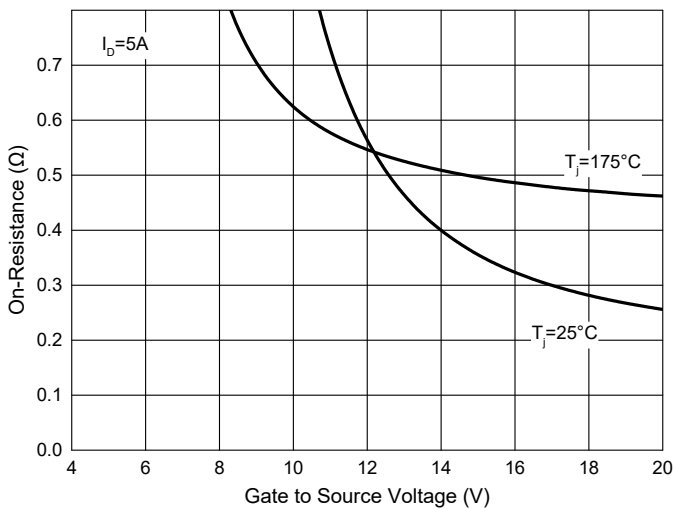
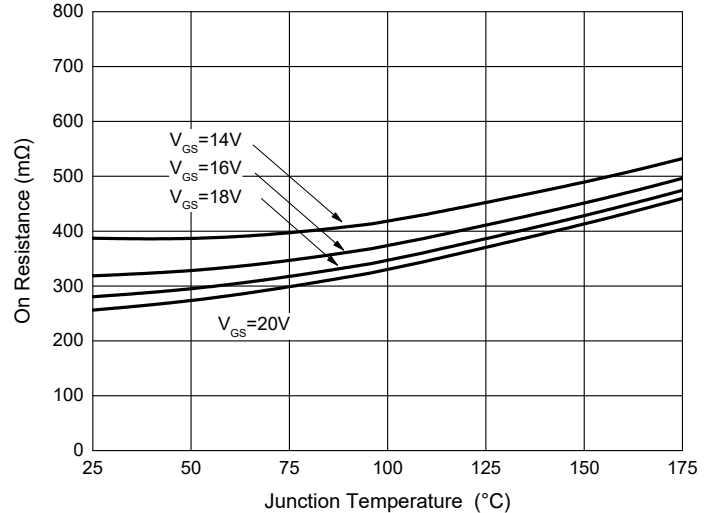


Fig. 6 - On-Resistance vs Temperature



Curve Characteristics

Fig. 7 - Normalized On-Resistance vs Temperature

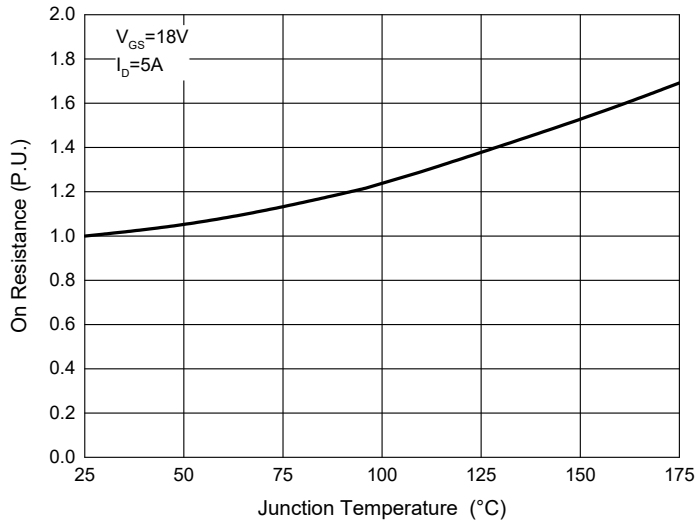


Fig. 8 - Body Diode Characteristic

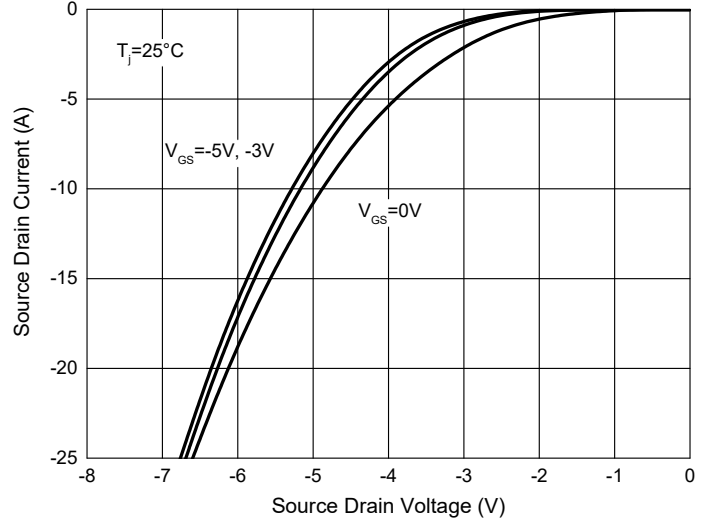


Fig. 9 - Body Diode Characteristic

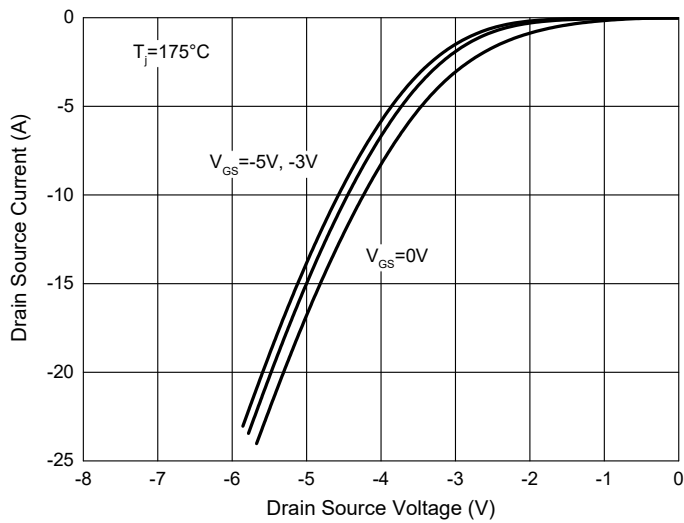


Fig. 10 - Output capacitor stored energy

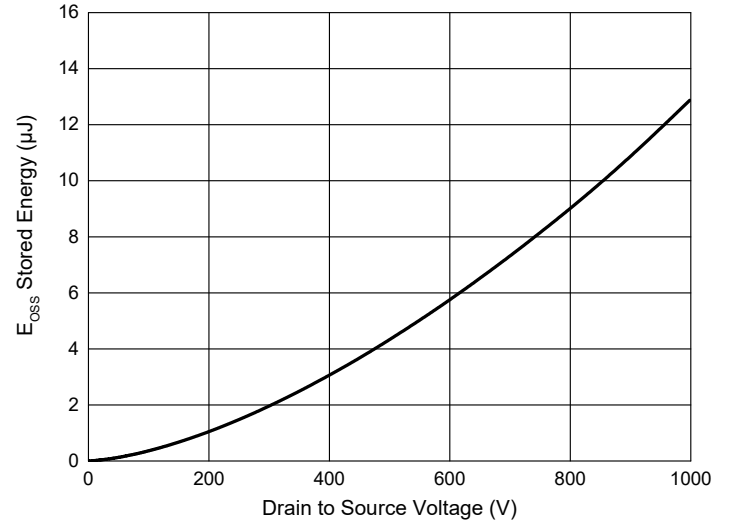


Fig. 11 - Threshold Voltage vs Temperature

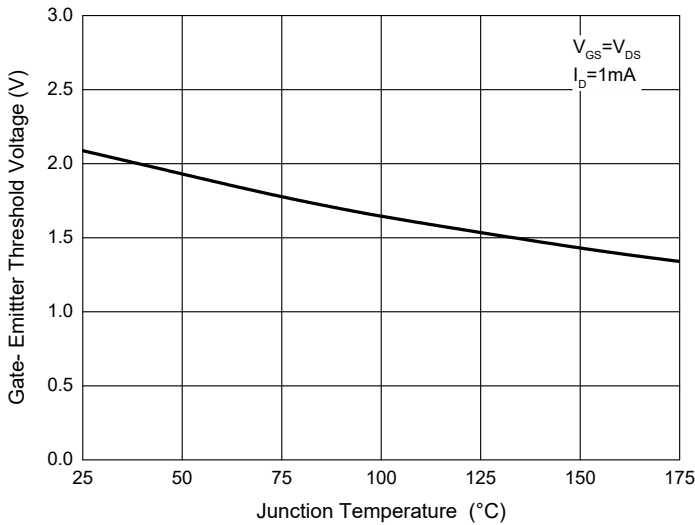
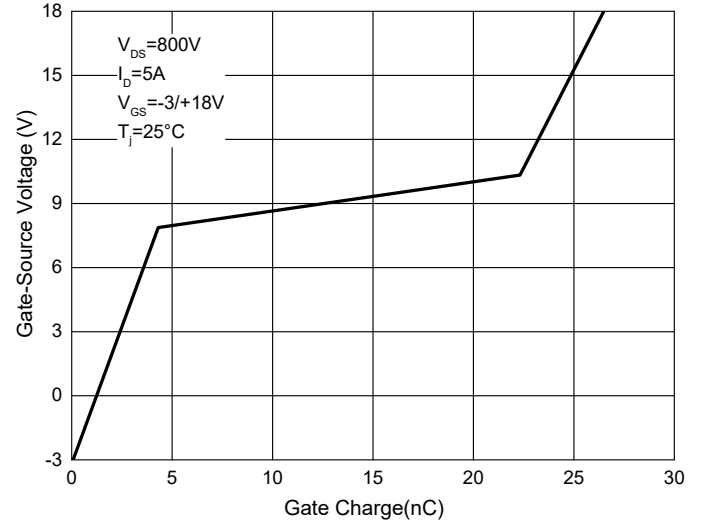


Fig. 12 - Typical Gate Charge



Curve Characteristics

Fig. 13 - Capacitance Characteristics

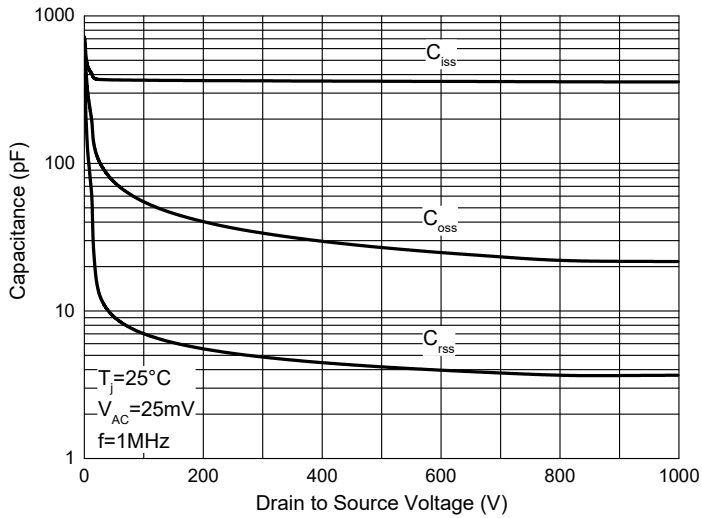


Fig. 14 - Capacitance Characteristics

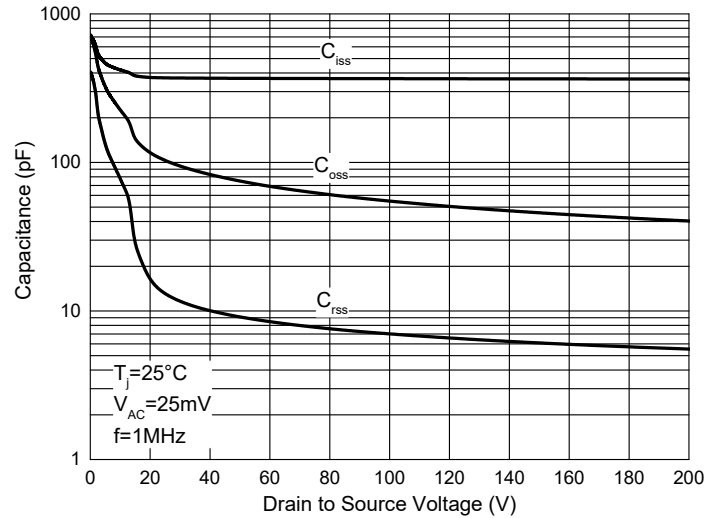


Fig. 15 - Drain Current Derating vs Case Temperature

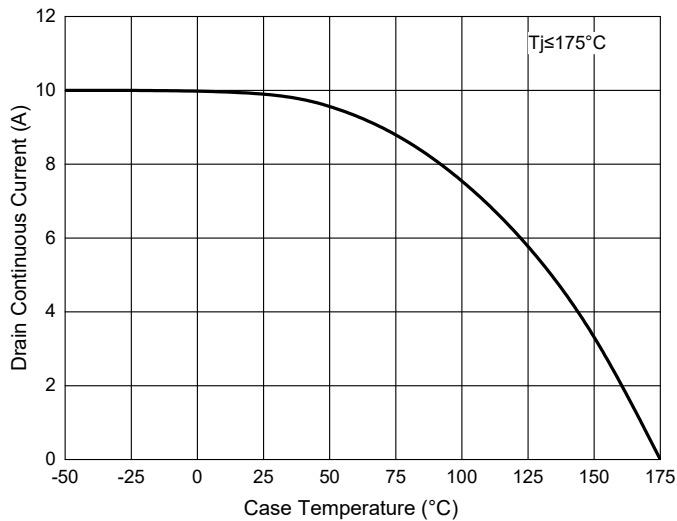


Fig. 16 - Junction to Case Transient Thermal Impedance

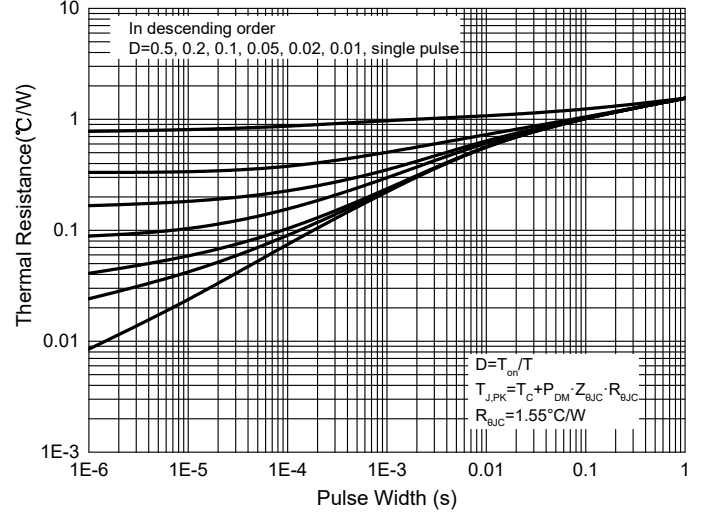


Fig. 17 - Safe Operation Area

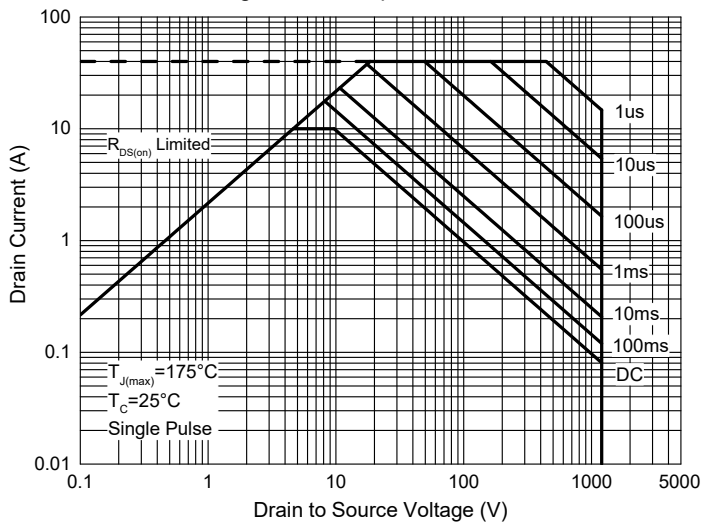
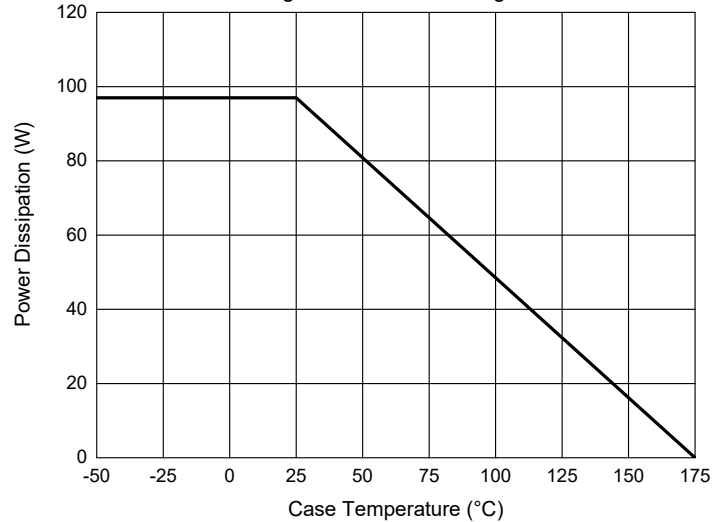


Fig. 18 - Power Derating



Ordering Information

Device	Packing
SICW280N120A-BP	Tube:30pcs/Tube, 1.8K/Ctn

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