

Features

- High speed switching
- Essentially no switching losses
- Reduction of heat sink requirements
- Higher Frequency Applicability
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant("P" Suffix Designates RoHS Compliant. See Ordering Information) (Note2)

Maximum Ratings

- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance Junction to Ambient,Max(Note 3): 62°C/W
- Thermal Resistance Junction to Case,Typ : 0.41°C/W

Applications

- Solar Inverter
- EV Charging Station
- UPS
- Industrial Power Supply

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V _{DS}	1200	V
Gate-Source Voltage ^(Note 4)		V _{GSmax}	-8/+22	V
Recommended Gate-Source Voltage		V _{GSop}	-4/+18	V
Continuous Drain Current V _{GS} =18V	T _C =25°C	I _D	80	A
	T _C =100°C		55	
Pulsed Drain Current ^(Note 5)		I _{DM}	178	A
Avalanche energy,Single pulse ^(Note 6)		E _{AS}	1.1	J
Total Power Dissipation	T _C =25°C	P _D	365	W
	T _C =100°C		182	

Note1:Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Note2:High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.

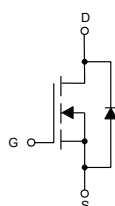
Note3:Device in a still air environment with $T_A=25^{\circ}C$.

Note4:AC f > 1Hz, duty cycle < 1%

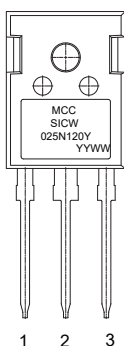
Note5:Pulse Test: Pulse Width Limited by T_{jmax} .

Note6: $V_{DD}=75V, L=30mH$

Internal Structure and Marking Code



1. Gate
2. Drain
3. Source

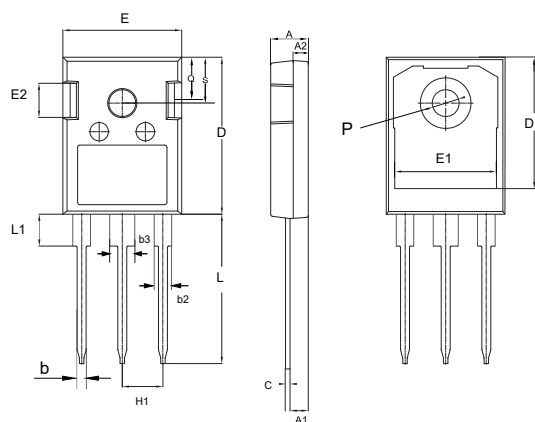


Device Code: SICW025N120Y

Date Code: YYWW (Year & Week)

SiC N-CHANNEL MOSFET

TO-247AB



DIMENSIONS

DIM	INCHES		mm		NOTE
	MIN	MAX	MIN	MAX	
A	0.189	0.205	4.80	5.20	
A1	0.090	0.100	2.29	2.54	
A2	0.075	0.083	1.90	2.10	
b	0.043	0.051	1.10	1.30	
b2	0.075	0.087	1.91	2.20	
b3	0.115	0.126	2.92	3.20	
C	0.020	0.028	0.50	0.70	
D	0.819	0.840	20.80	21.34	
D1	0.686	0.702	17.43	17.83	
E	0.620	0.635	15.75	16.13	
E1	0.514	0.530	13.06	13.46	
E2	0.170	0.190	4.32	4.83	
H1	0.215		5.45		TYP
L	0.781	0.797	19.85	20.25	
L1	0.159	0.177	4.05	4.49	
P	0.140	0.144	3.55	3.65	Φ
Q	0.220	0.244	5.59	6.19	
S	0.242		6.15		TYP

Electrical Characteristics @ $T_J=25^{\circ}\text{C}$ (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 =100uA	1200			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =18V		10	100	nA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =15mA	2.0	2.7	4.0	V
		V _{DS} =V _{GS} , I _D =15mA,T _J =175 ℃		2.0		
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =18V, I _D =40A		25	40	mΩ
		V _{GS} =18V, I _D =40A,T _J =175 ℃		46		mΩ
Transconductance	g _{FS}	V _{DS} =20V, I _D =40A		28		S
		V _{DS} =20V, I _D =40A,T _j =175 ℃		26		
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =800V,V _{GS} =0V, f=100kHz V _{AC} =25mV		4710		pF
Output Capacitance	C _{oss}			160		
Reverse Transfer Capacitance	C _{rss}			6.8		
Coss Stored Energy	E _{oss}				84	
Total Gate Charge	Q _g	V _{DS} =800V,V _{GS} =-4/+18V, I _D =40A		152		nC
Gate-Source Charge	Q _{gs}			40		
Gate-Drain Charge	Q _{gd}			61		
Internal Gate Resistance	R _g	f=1MHz		2		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} =800V, V _{GS} =-4/+18V, R _G =2.4Ω, I _D =40A,L=100uH		19		ns
Turn-On Rise Time	t _r			37.5		
Turn-Off Delay Time	t _{d(off)}			25		
Turn-Off Fall Time	t _f			14		
Turn-On switching energy	E _{on}			580		μJ
Turn-Off switching energy	E _{off}			249		
Diode Characteristics						
Maximum Continuous Diode Forward Current	I _S			70		A
Diode Forward Voltage	V _{SD}	V _{GS} =-4V, I _{SD} =20A		4.8		V
		V _{GS} =0V, I _{SD} =20A,T _j =175 ℃		3.0		V
Reverse Recovery Time	t _{rr}	I _{SD} =40A, V _R =800V, V _{GS} =-4V dI _F /dt=2500A/μs		48		ns
Reverse Recovery Charge	Q _{rr}			323		nC
Peak reverse recovery current	I _{rrm}			11		A

Curve Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Fig. 1 - Typical Output Characteristic

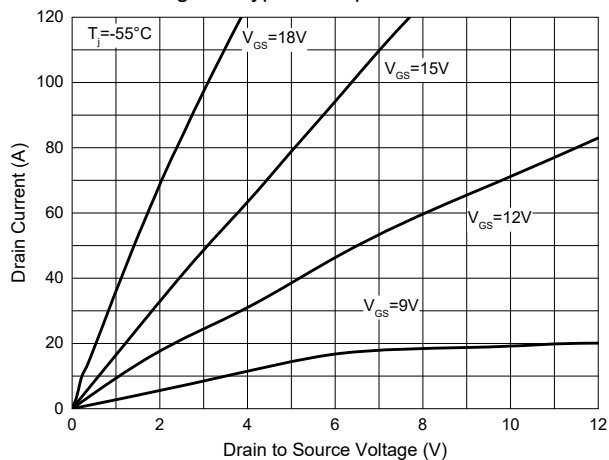


Fig. 2 - Typical Output Characteristic

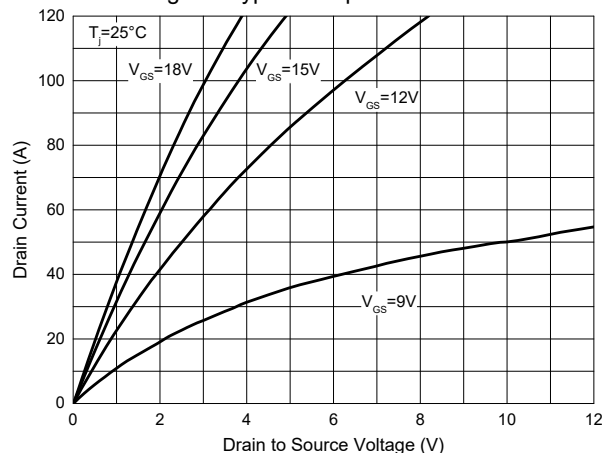


Fig. 3 - Typical Output Characteristic

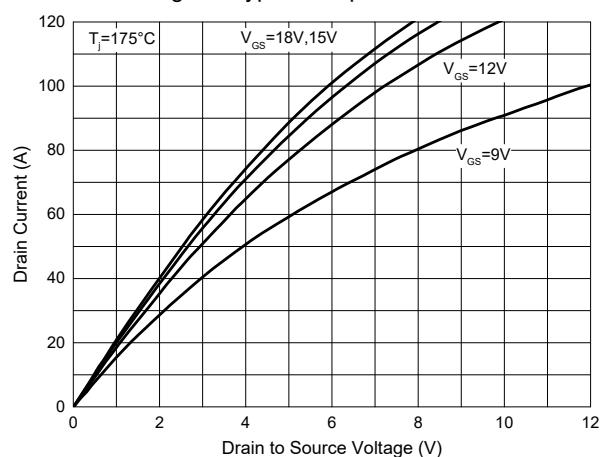


Fig. 4 - Typical Transfer Characteristic

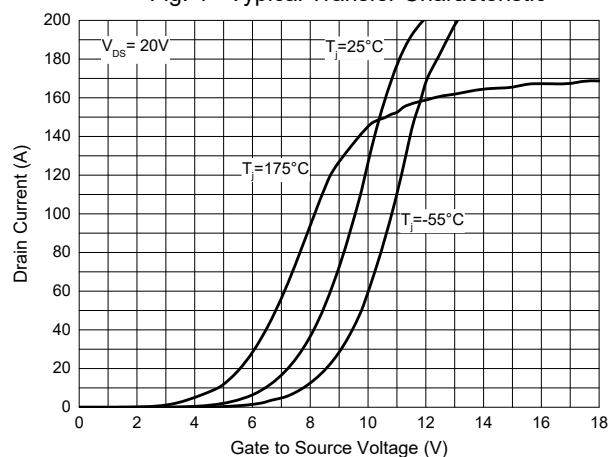


Fig. 5 On-Resistance vs Temperature

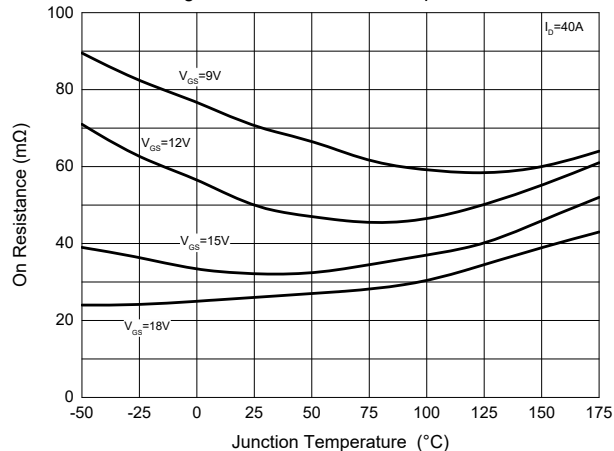
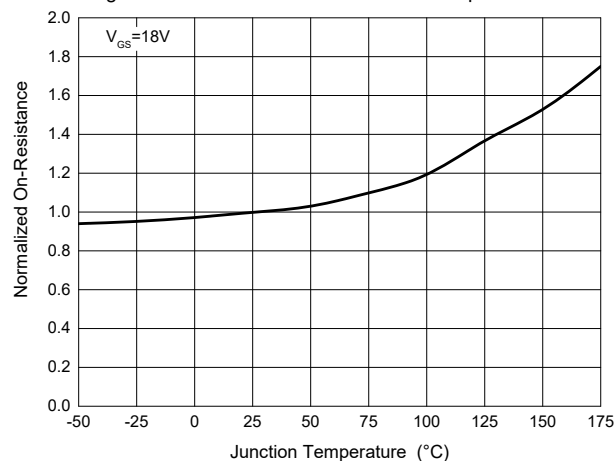


Fig. 6 - Normalized On-Resistance vs Temperature



Curve Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Fig. 7 - On-Resistance vs. Drain Current

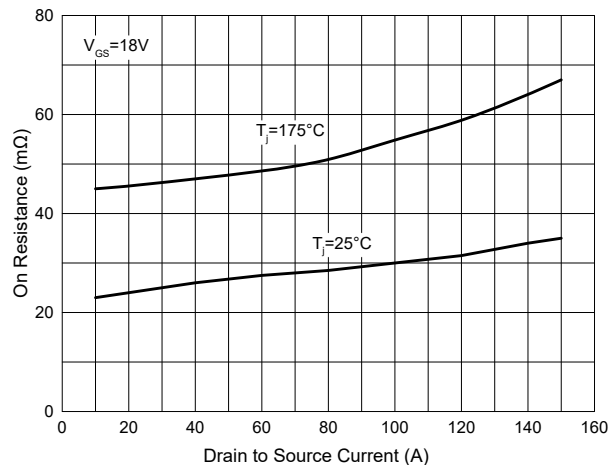


Fig. 8 - Reverse Output Voltage

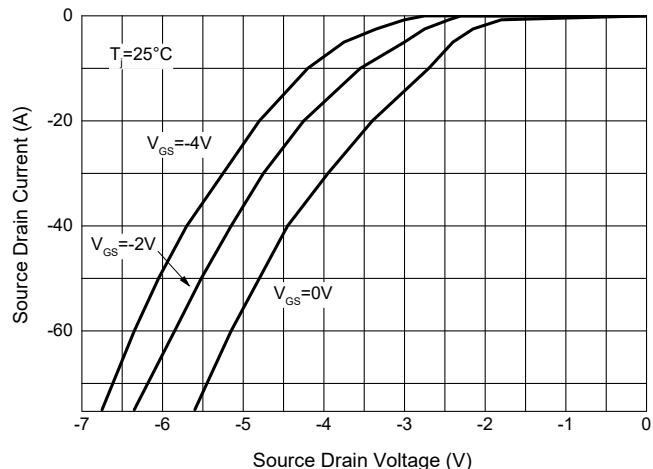


Fig. 9 - Reverse Output Voltage

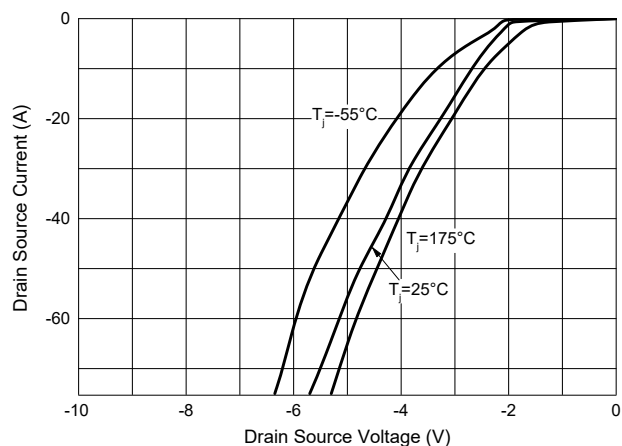


Fig. 10 - 3rd Quadrant Characteristic

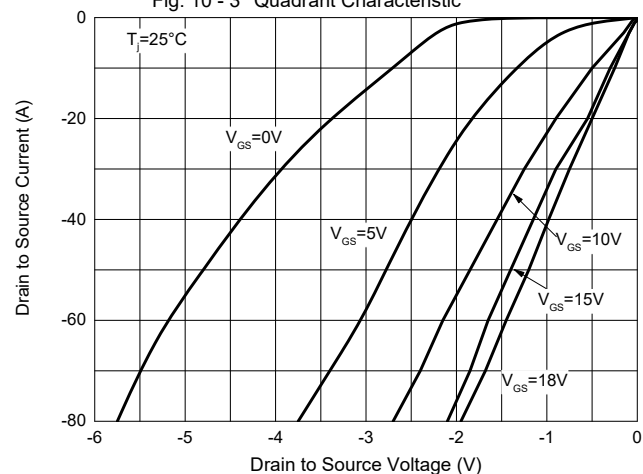


Fig. 11 - Threshold Voltage vs Temperature

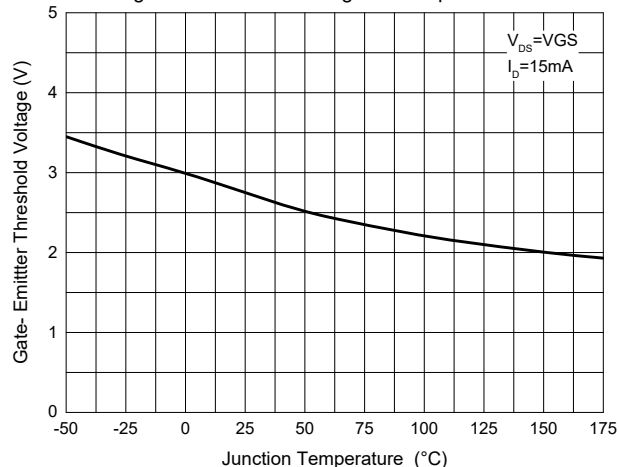
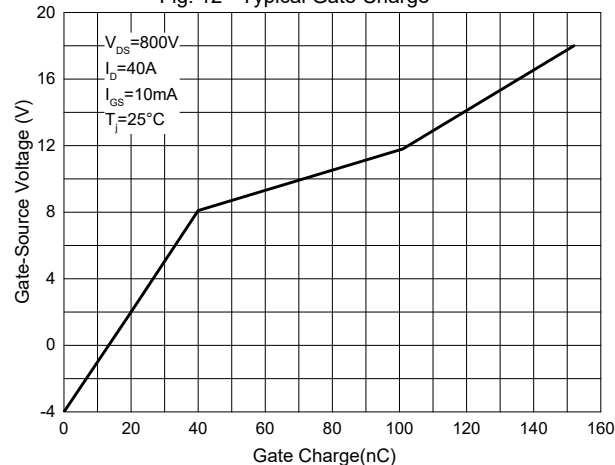


Fig. 12 - Typical Gate Charge



Curve Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Fig. 13 - Capacitance Characteristics

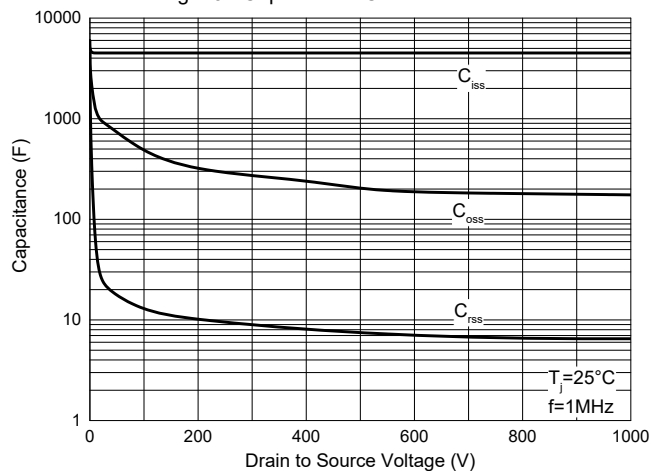


Fig. 14 - Capacitance Characteristics

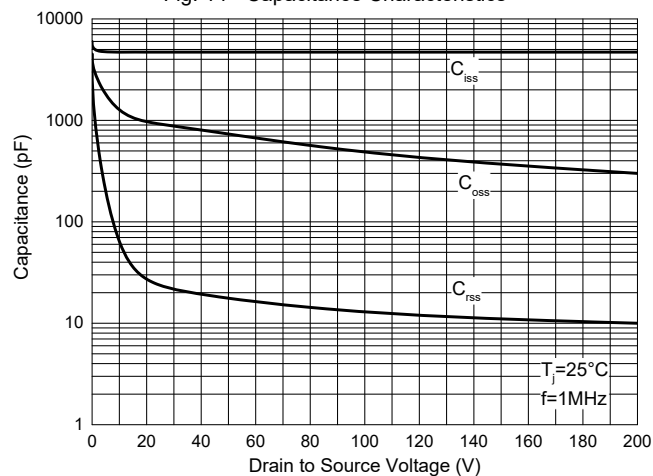


Fig. 15 - Output capacitor stored energy

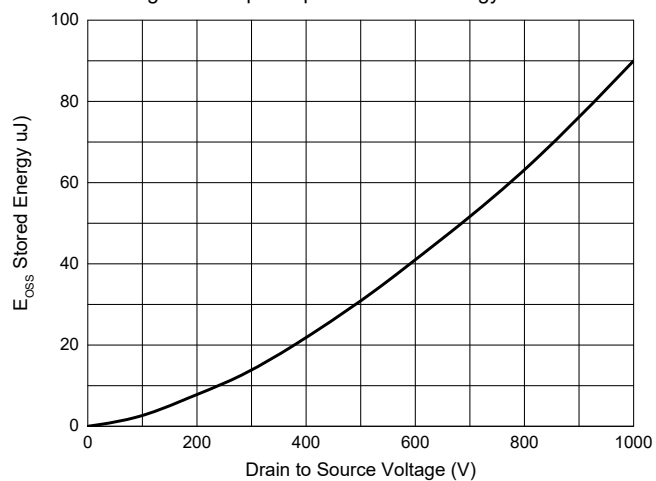


Fig. 16 - Power Derating

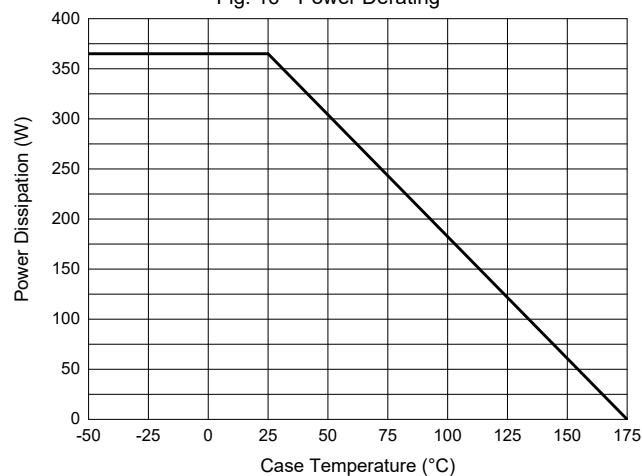


Fig. 17 - Drain Current Derating

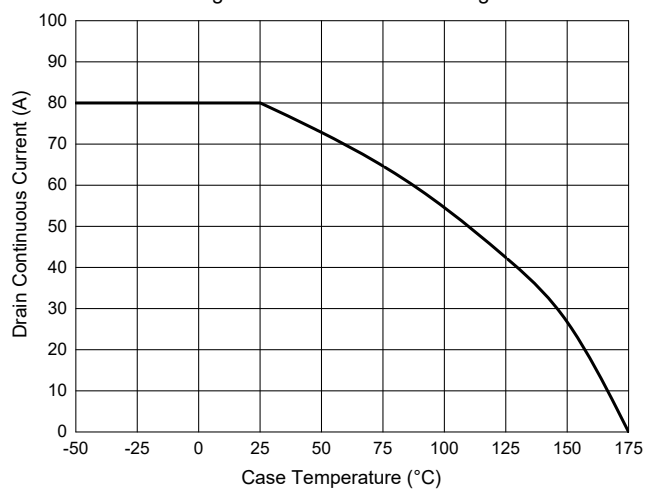
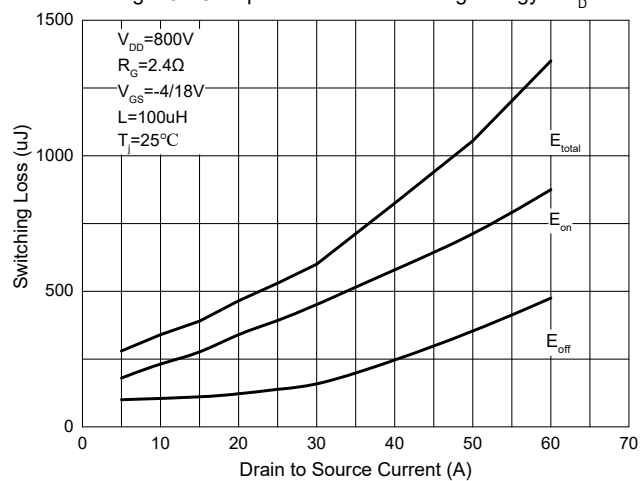


Fig. 18 - Clamped Inductive Switching Energy vs I_D



Curve Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Fig. 19 - Switch Loss VS R_G

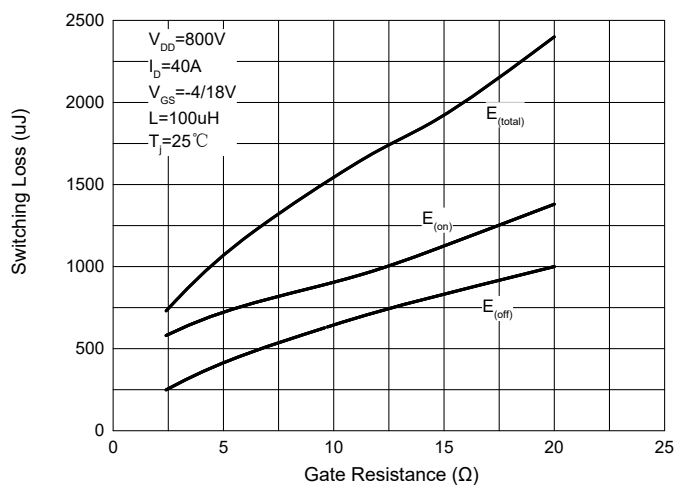


Fig. 20 - Switching Times vs Gate Resistance

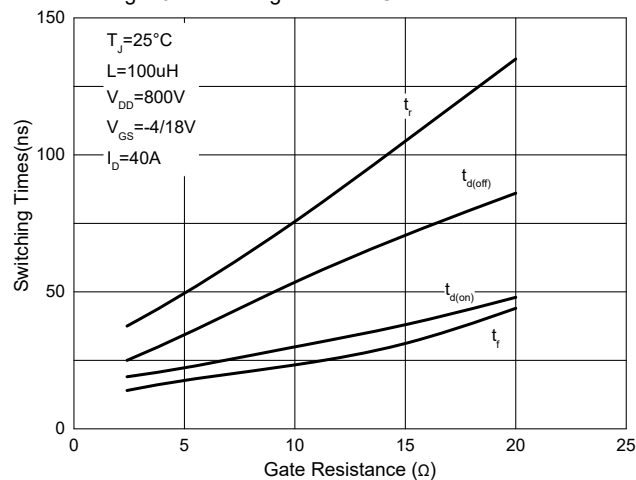


Fig. 21- Safe Operation Area

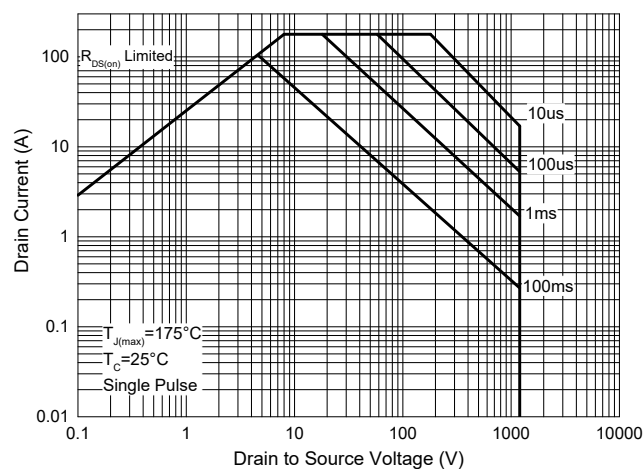
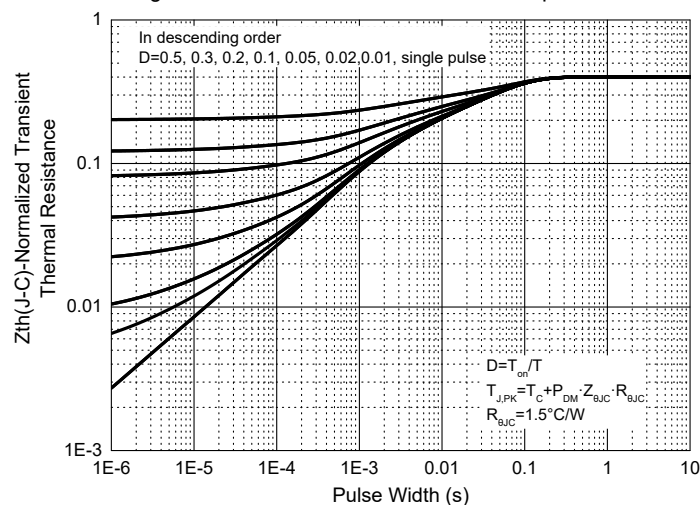


Fig. 22- Normalized Transient Thermal Impedance



Ordering Information

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

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