

Features

- SiC MOSFET Technology
- AEC-Q101 qualified
- High Switching Speed With
- Fast Intrinsic Diode With Low Reverse Recovery
- 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 : 0.45°C/W

Applications

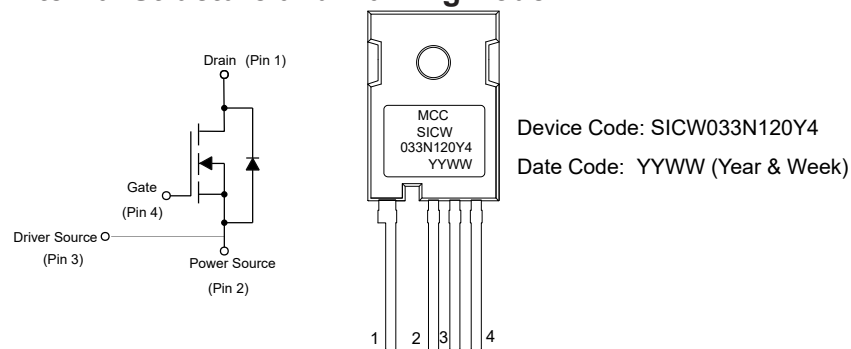
- Solar Inverter
- Motor Drives
- Photovoltaic Inverter,
- Uninterruptible Power Supply

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage(Note 4)		V_{GSmax}	-8/+19	V
Recommended Gate-Source Voltage		V_{GSop}	-4/+15	V
Continuous Drain Current $V_{GS}=18V$	$T_C=25^{\circ}C$	I_D	66	A
	$T_C=100^{\circ}C$		48	
Pulsed Drain Current (Note 5)		I_{DM}	120	A
Single Avalanche Energy (Note 6)		E_{AS}	500	mJ
Total Power Dissipation	$T_C=25^{\circ}C$	P_D	333	W
	$T_C=110^{\circ}C$		144	

Note

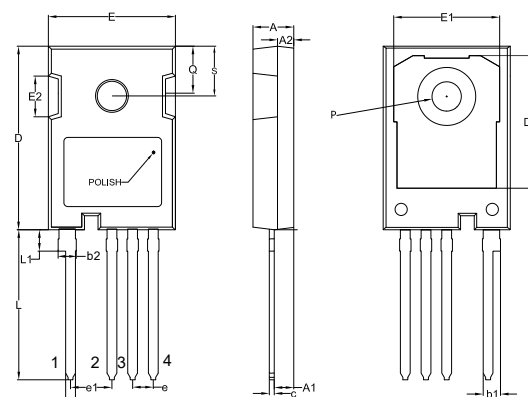
- 1:Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 2:High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
- 3:Device in a still air environment with $T_A=25^{\circ}C$.
- 4:Absolute maximum values
- 5:Pulse Test: Pulse Width Limited by T_{jmax} .
- 6: $V_{DD}=75V, L=10mH$

Internal Structure and Marking Code



SiC N-CHANNEL MOSFET

TO-247-4



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.189	0.205	4.80	5.20	
A1	0.090	0.098	2.29	2.50	
A2	0.074	0.082	1.88	2.08	
b	0.043	0.054	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	0.028	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		
e1	0.199		5.06		
L	0.683	0.694	17.34	17.64	
L1	0.157	0.169	4.00	4.30	
P	0.138	0.148	3.51	3.75	Φ
Q	0.220	0.236	5.60	6.00	
S	0.220	0.248	5.60	6.30	

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} =15V		10	100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V		1	50	μA	
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =11.5mA	2.0	2.5	4.0	V	
		V _{DS} =V _{GS} , I _D =11.5mA,T _J =175℃		2.0			
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =15V, I _D =40A		33	44	mΩ	
		V _{GS} =15V, I _D =40A,T _J =175℃		63			
Transconductance	g _{FS}	V _{DS} =20V, I _D =40A		26		S	
		V _{DS} =20V, I _D =40A,T _J =175℃		22			
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} =1000V,V _{GS} =0V, f=100kHz V _{AC} =25mV		3456		pF	
Output Capacitance	C _{oss}			127			
Reverse Transfer Capacitance	C _{rss}			7.2			
Coss Stored Energy	E _{oss}				69		μJ
Total Gate Charge	Q _g	V _{DS} =800V,V _{GS} =-4/+15V, I _D =40A		116		nC	
Gate-Source Charge	Q _{gs}			39			
Gate-Drain Charge	Q _{gd}			44			
Internal Gate Resistance	R _g	f=1MHz		3	5	Ω	
Turn-On Delay Time	t _{d(on)}	V _{DS} =800V, V _{GS} =-4/+15V, R _G =2.5Ω, I _D =40A,L=65uH		17		ns	
Turn-On Rise Time	t _r			24			
Turn-Off Delay Time	t _{d(off)}			15			
Turn-Off Fall Time	t _f			10			
Turn-On switching energy	E _{on}				500		μJ
Turn-Off switching energy	E _{off}				80		
Diode Characteristics							
Maximum Continuous Diode Forward Current	I _S				66	A	
Diode Forward Voltage	V _{SD}	V _{GS} =-4V, I _{SD} =20A		5.0		V	
		V _{GS} =0V, I _{SD} =20A,T _J =175℃		3.3			
Reverse Recovery Time	t _{rr}	V _R =800V, V _{GS} =-4V, I _D =40A, di/dt=2250A/uS		27		ns	
Reverse Recovery Charge	Q _{rr}				478		nC
Peak reverse recovery currente	I _{rrm}				27		A

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

Figure 1. Output Characteristics $T_j = -55^\circ\text{C}$

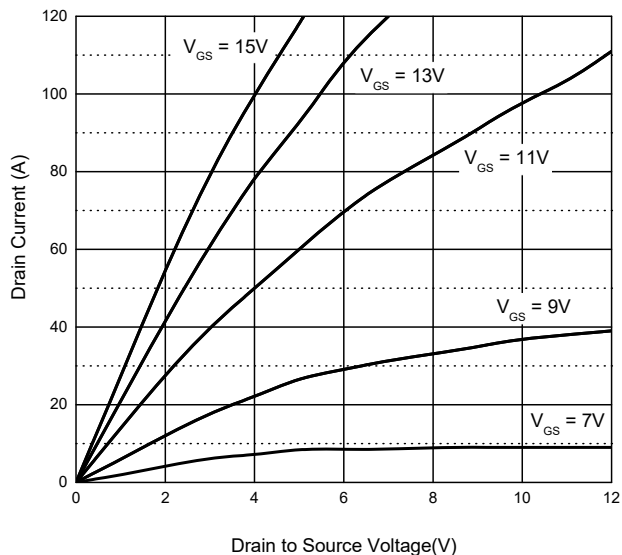


Figure 2. Output Characteristics $T_j = 25^\circ\text{C}$

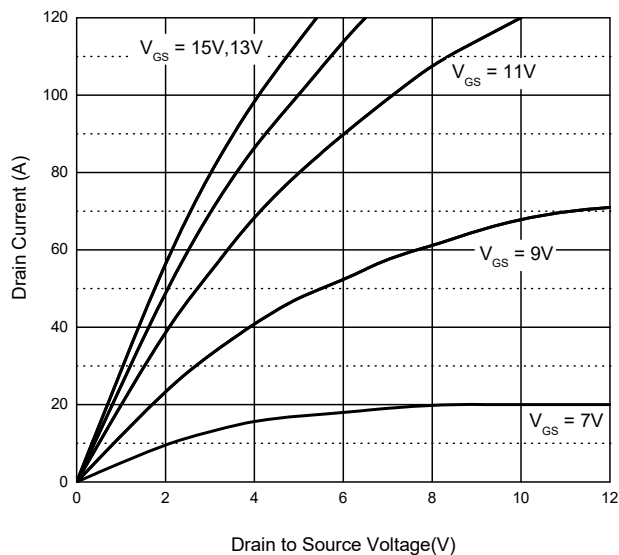


Figure 3. Output Characteristics $T_j = 175^\circ\text{C}$

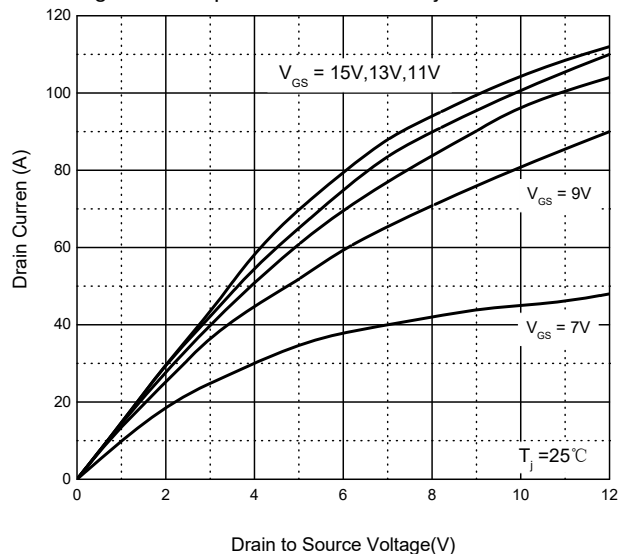


Figure 4. Transfer Characteristics for various junction temperature

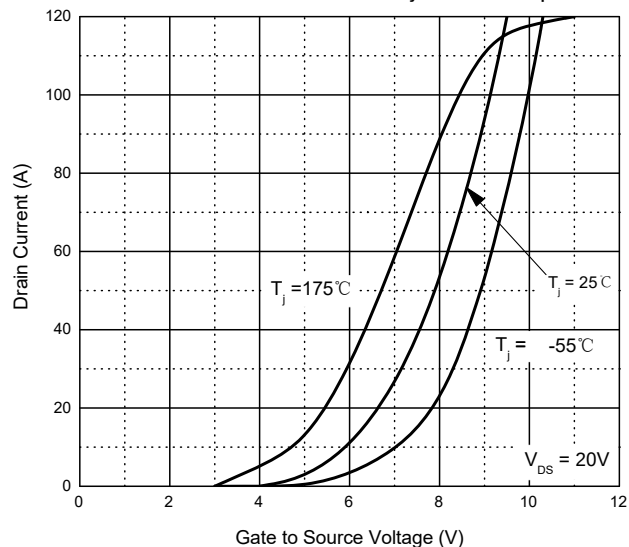


Figure 5. On-resistance vs. temperature for various gate voltage

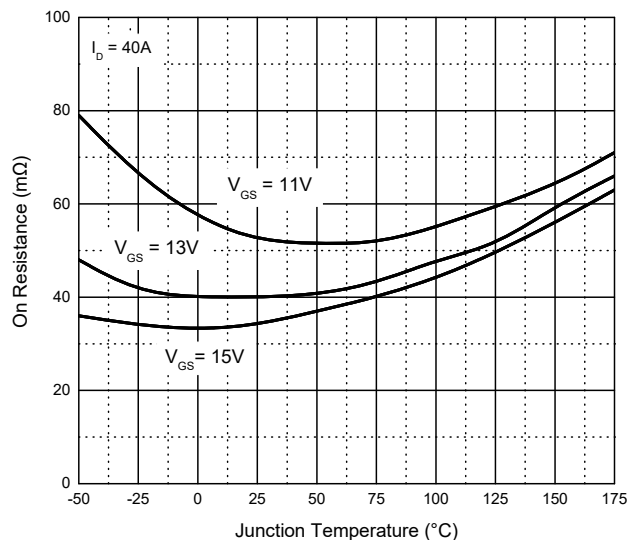
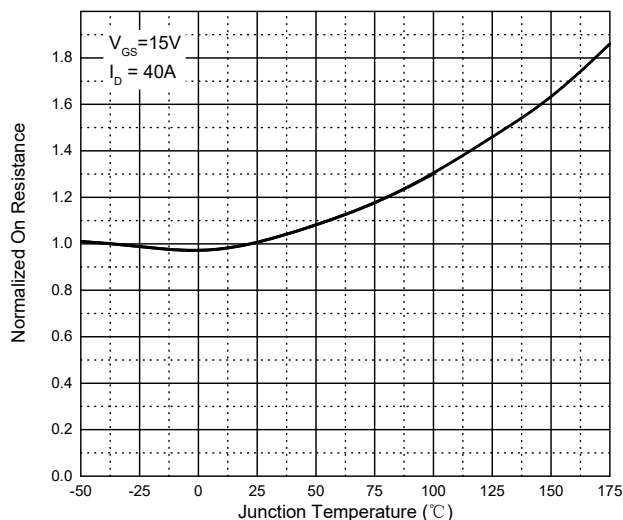


Figure 6. Normalized on-resistance vs. temperature



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

Figure 7. On-resistance vs. drain current

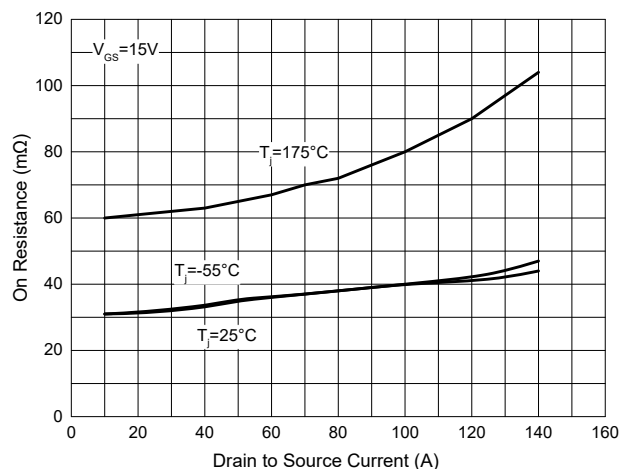


Figure 8. Body diode characteristic at $T_J = 25^\circ\text{C}$

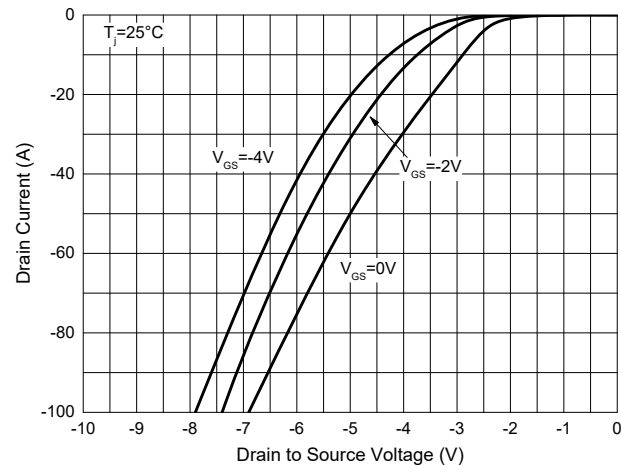


Figure 9. Body diode characteristic

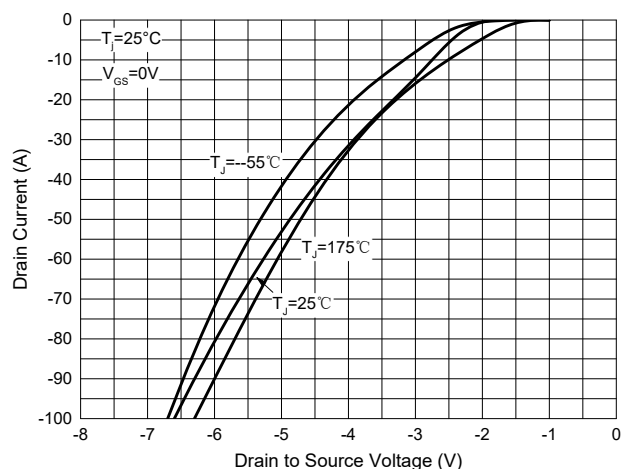


Figure 10. 3rd quadrant characteristic at $T_J = 25^\circ\text{C}$

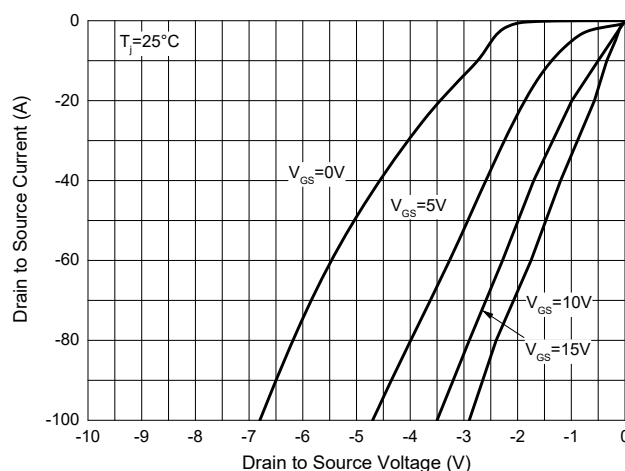


Figure 11. Threshold voltage vs. temperature

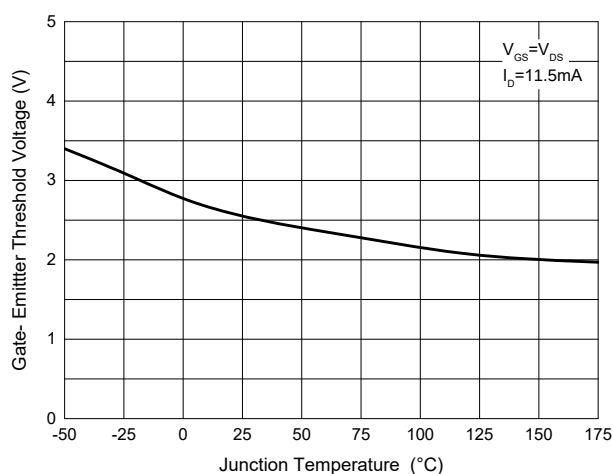
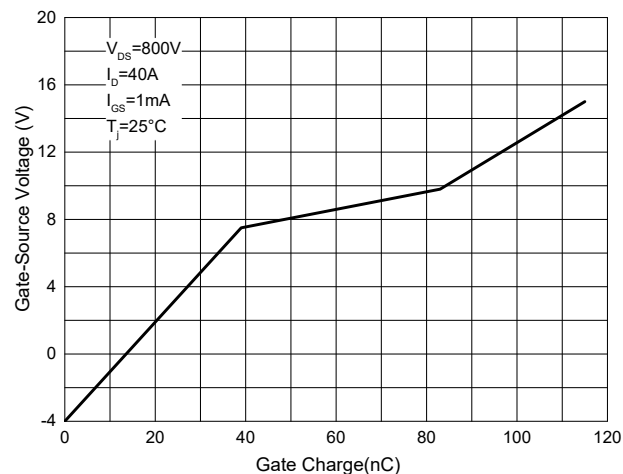


Figure 12. Gate charge characteristic



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

Figure 13. Capacitances vs. drain source voltage (0-1000V)

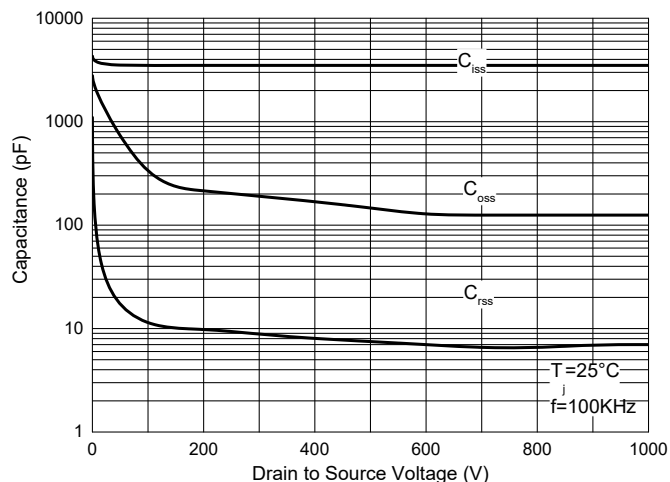


Figure 14. Capacitances vs. drain source voltage (0-200V)

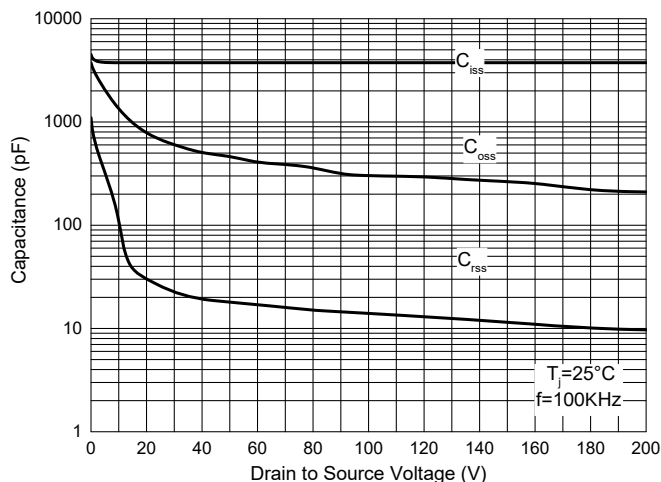


Figure 15. Output capacitor stored energy

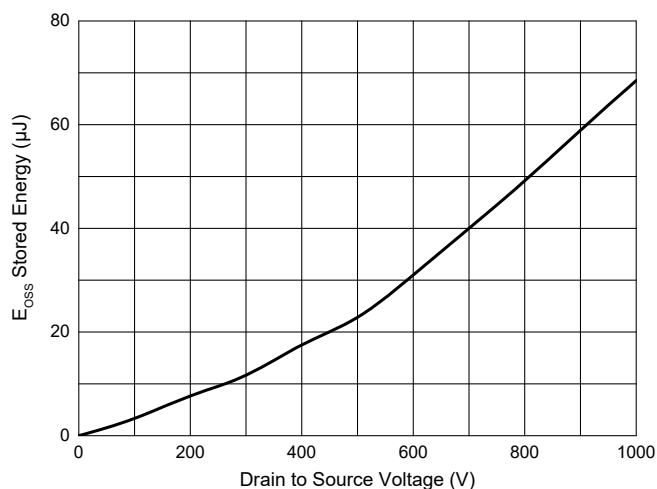


Figure 16. Reverse characteristics vs. T_J

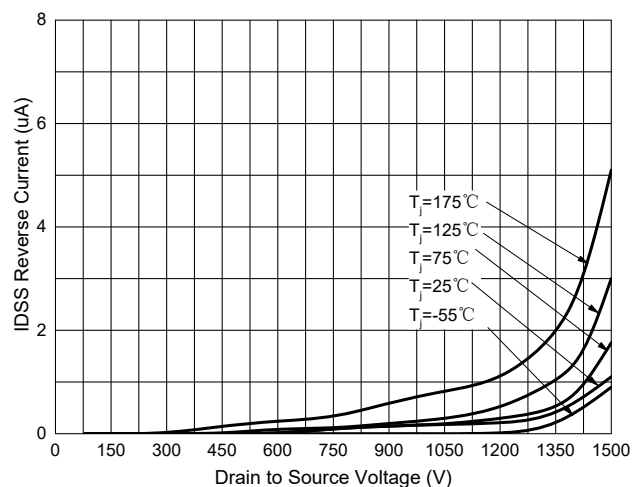


Figure 17. Maximum power dissipation derating vs. case temperature

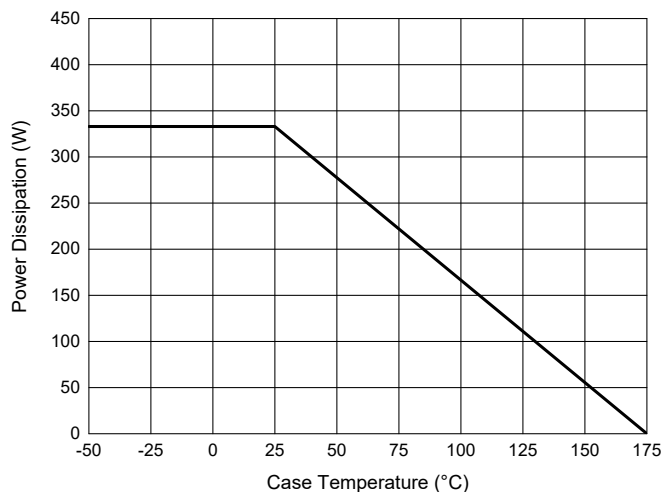
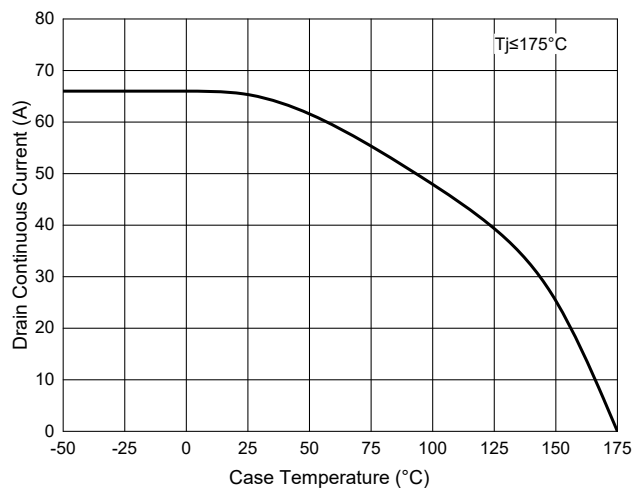


Figure 18. Continuous drain current derating vs. case temperature



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

Figure 19. Transient thermal impedance (junction - case)

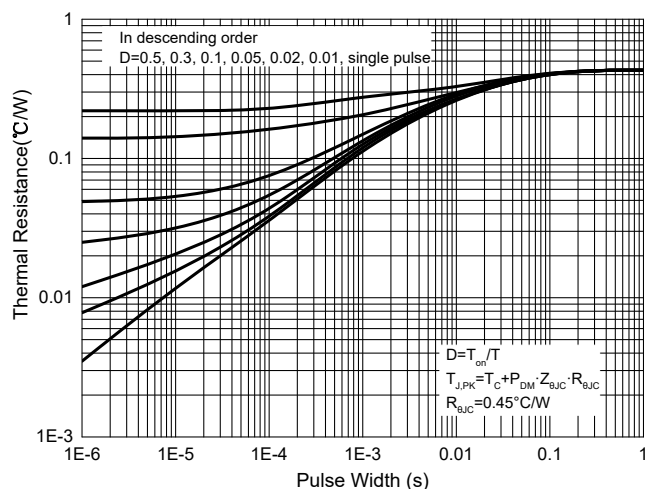


Figure 20. Clamped Inductive switching energy vs. drain current

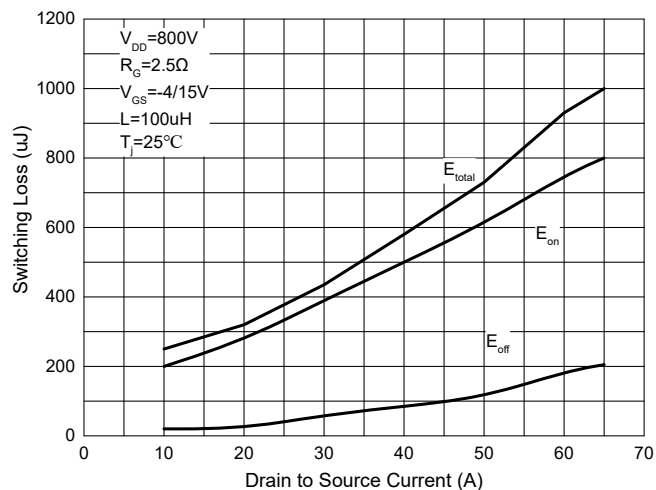


Figure 21. Clamped inductive switching energy vs. R_g

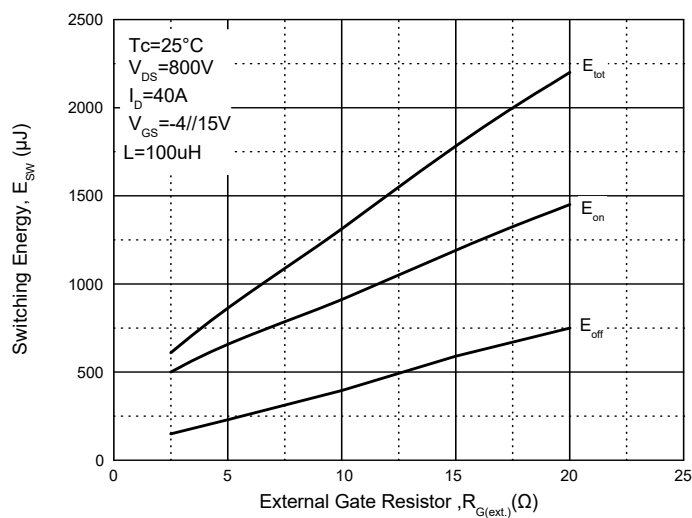
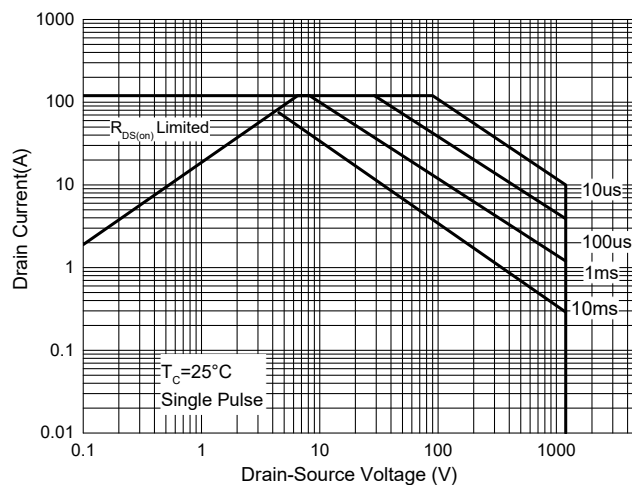


Figure 22. Safe Operating Area



Ordering Information

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

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