Features

- SiC MOSFET Technology
- High Speed Switching
- High switching speed with low capacitance
- Very low switching losses
- Excellent avalanche ruggedness
- Halogen Free. “Green” Device (Note 1)
- Lead Free Finish/RoHS Compliant("P" Suffix Designates RoHS Compliant. See Ordering Information) (Note2)

SiC N-CHANNEL MOSFET

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): 40°C/W
- Thermal Resistance Junction to Case,Typ : 1.25°C/W

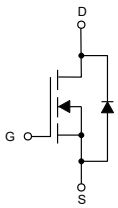
Applications

- Solar inverters
- Uninterrupted power supplies
- Switch mode power supplies
- Motor drives

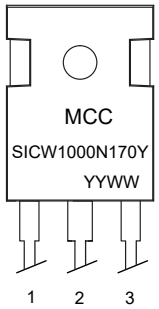
Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	1700	V
Gate-Source Voltage(Note 4)		V_{GSmax}	-10/+27	V
Gate-Source Voltage		V_{GSmax}	-8/+24	
Gate-Source Voltage		V_{GSop}	-5/+20	V
Continuous Drain Current V_{GS}=18V	Tc=25°C	I_D	6.8	A
	Tc=100°C		4.8	
Pulsed Drain Current (Note 5)		I_{DM}	21	A
Total Power Dissipation	Tc=25°C	P_D	100	W
Avalanche Energy, Single Pulse	V_{DD}=50V, L=5mH	E_{AS}	150	mJ

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 TA=25°C.
Note4:tp ≤ 0.5us, D < 1%
Note5:Pulse Test: Pulse Width Limited by Tjmax.

Internal Structure and Marking Code

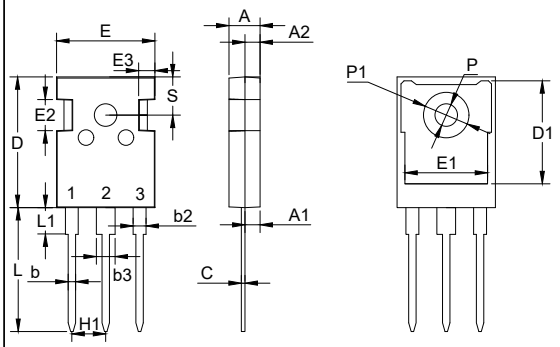


1. Gate
2. Drain
3. Source



Device Code: SICW1000N170Y
Date Code: YYWW (Year & Week)

TO-247AB



DIMENSIONS					
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	-	0.177	-	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 @ 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	1700			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =20V			250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=1700V, V_{GS}=0V			100	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.5mA	2	2.6	4.0	V
		V_{DS}=V_{GS}, I_D=0.5mA,T_j=175℃				
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=20V, I_D=2A		1.0	1.2	Ω
		V_{GS}=20V, I_D=2A,T_j=175°C		1.5		Ω
Internal Gate Resistance	R_g	f=1MHz, V_{AC}=25mV		6		Ω
Transconductance	g_{FS}	V_{DS}=20V, I_D=2A		1.0		S
		V_{DS}=20V, I_D=2A,T_j=175℃		1.2		
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=1000V,V_{GS}=0V, f=1MHz,V_{AC}=25mV		227		pF
Output Capacitance	C_{oss}			12.5		
Reverse Transfer Capacitance	C_{rss}			2		
Coss Stored Energy	E_{oss}			7.7		μJ
Total Gate Charge	Q_g	V_{DS}=1200V,V_{GS}=-5/+20V, I_D=2A, I_{GS}=1mA		16.7		nC
Gate-Source Charge	Q_{gs}			1.67		
Gate-Drain Charge	Q_{gd}			9.2		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=1200V, V_{GS}=-5/+20V, R_G=12Ω, I_D=2A,L=1364uH		18		ns
Rise Time	t_r			16		
Turn-Off Delay Time	$t_{d(off)}$			24		
Fall Time	t_f			79		
Turn-On switching energy	E_{on}	V_{DD}=1200V, V_{GS}=-5/+20V, R_G=12Ω, I_D=2A,L=1364uH		63		μJ
Turn-Off switching energy	E_{off}			29		

Electrical Characteristics @ T_j=25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Characteristics						
Continuous Body Diode Current	I_S	V_{GS}=-5V, T_C=25°C			5	A
Diode Forward Voltage	V_{SD}	V_{GS}=-5V, I_{SD}=1A		3.6		V
		V_{GS}=-5V, I_{SD}=1A,T_j=175℃		3.2		
Reverse Recovery Time	t_{rr}	V_{GS}=-5V, I_{SD}=2A, V_R=1200V, dI_F/dt=0.19KA/μs		34		ns
Reverse Recovery Charge	Q_{rr}			0.04		uC
Peak Reverse Recovery Current	I_{rrm}			1.85		A
Reverse Recovery Time	t_{rr}	V_{GS}=-5V, I_{SD}=2A, V_R=1200V, dI_F/dt=0.19KA/μs, T_j=175℃		39		ns
Reverse Recovery Charge	Q_{rr}			0.08		uC
Peak Reverse Recovery Current	I_{rrm}			3.57		A

Curve Characteristics(T_J=25℃ unless otherwise specified)

Figure 1. Output characteristics at T_j = -55℃

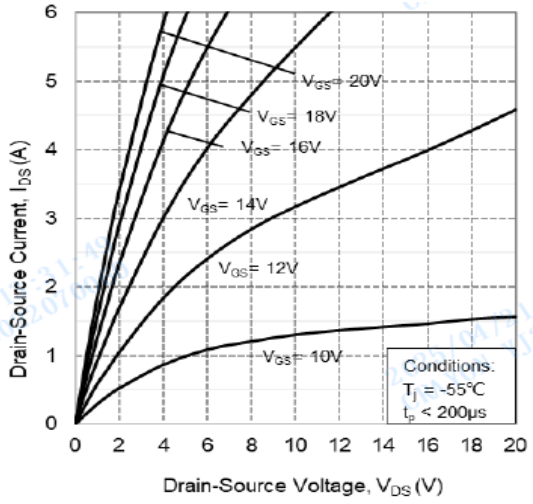


Figure 2. Output characteristics at T_j = 25℃

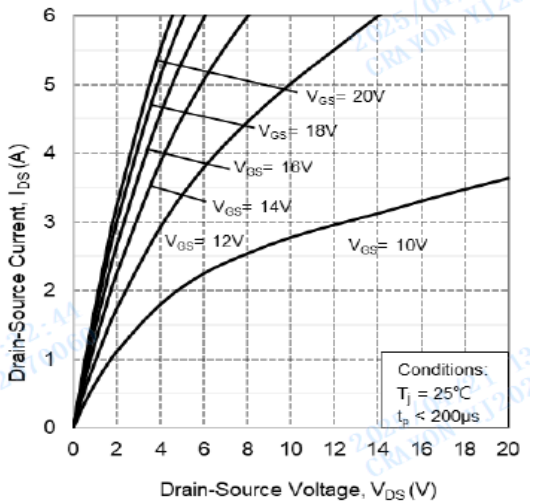


Figure 3. Output characteristics at T_j = 175℃

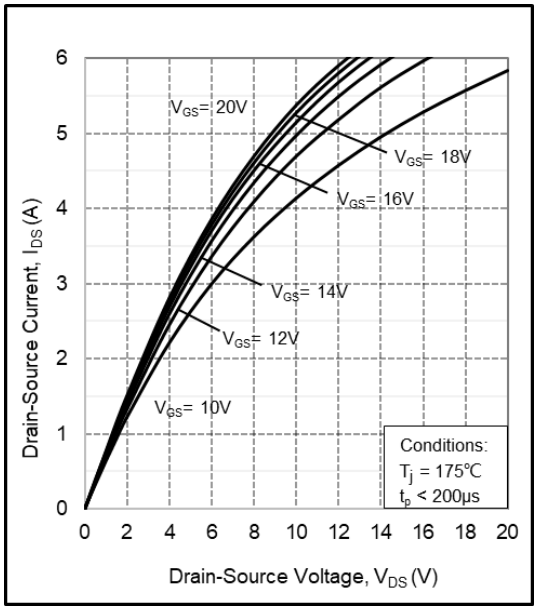


Figure 4. Normalized on-resistance vs. temperature

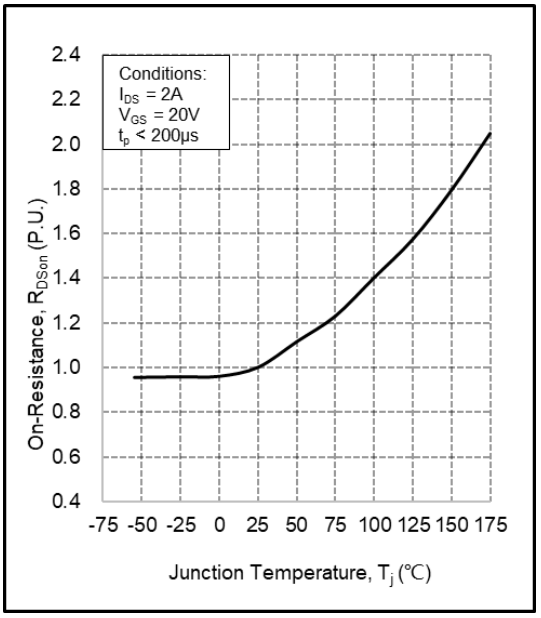


Figure 5. On-resistance vs. drain current

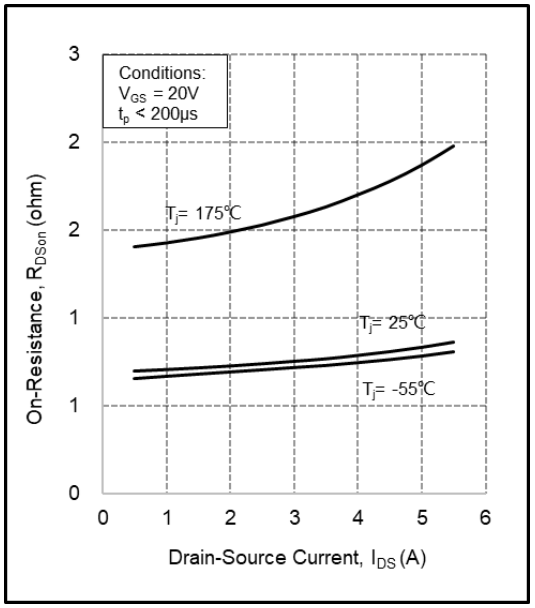
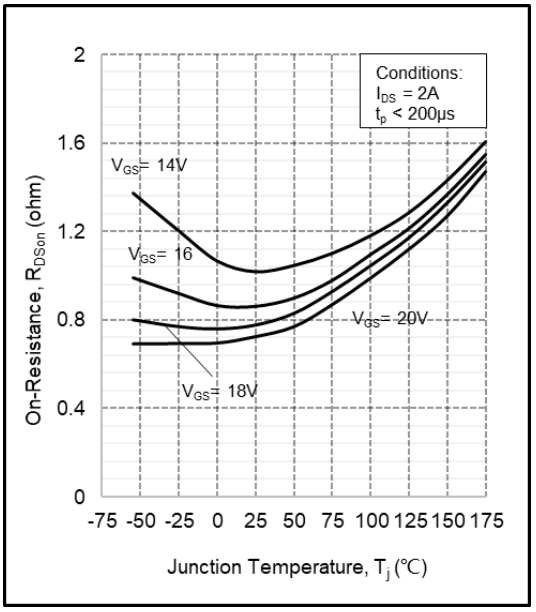


Figure 6. On-resistance vs. temperature



Curve Characteristics(T_J=25℃ unless otherwise specified)

Figure 7. Transfer characteristic

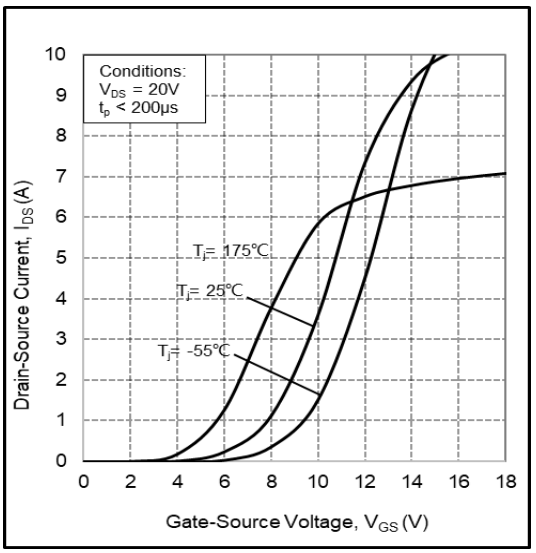


Figure 8. Body diode characteristic at T_j = -55℃

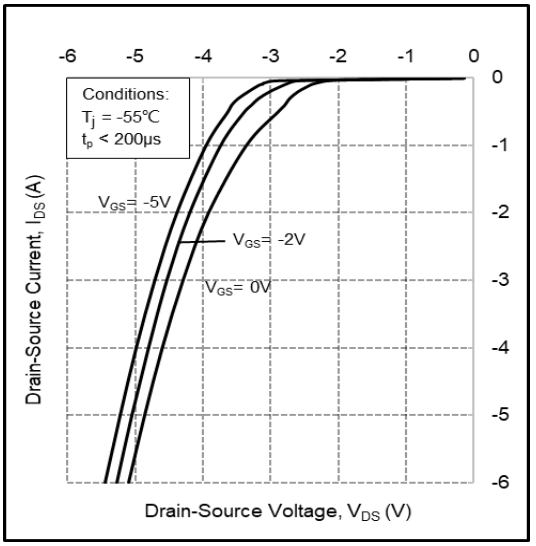


Figure 9. Body diode characteristic at T_j = 25℃

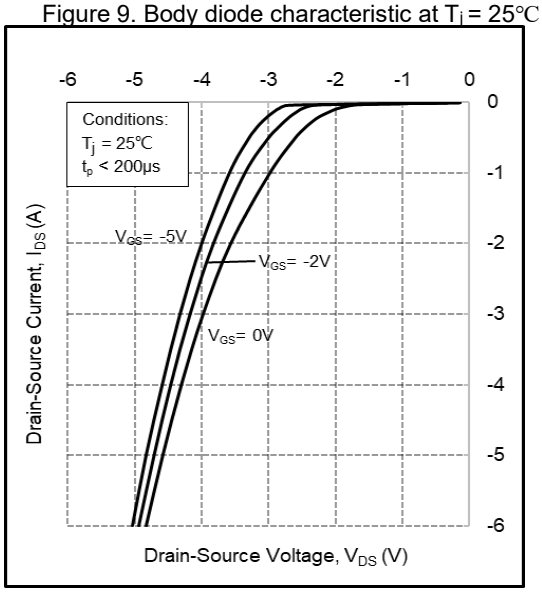


Figure 10. Body diode characteristic at T_j = 175℃

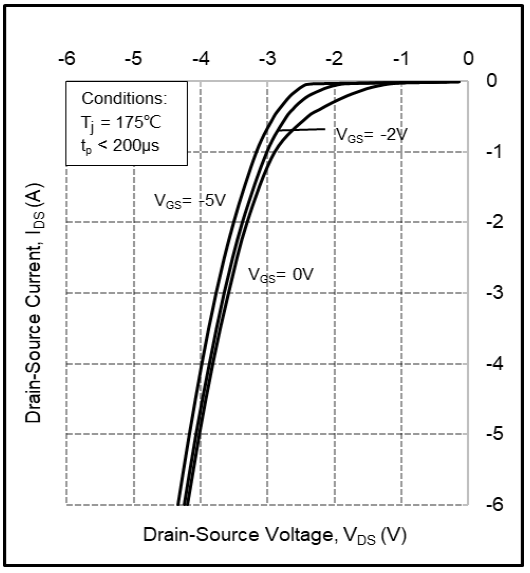


Figure 11. Threshold voltage vs. temperature

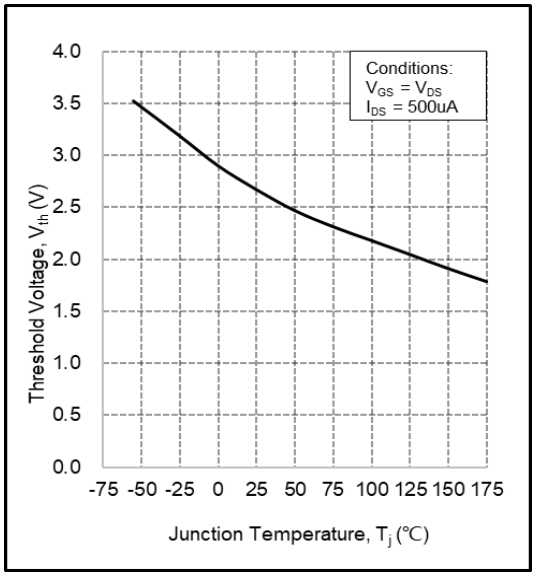
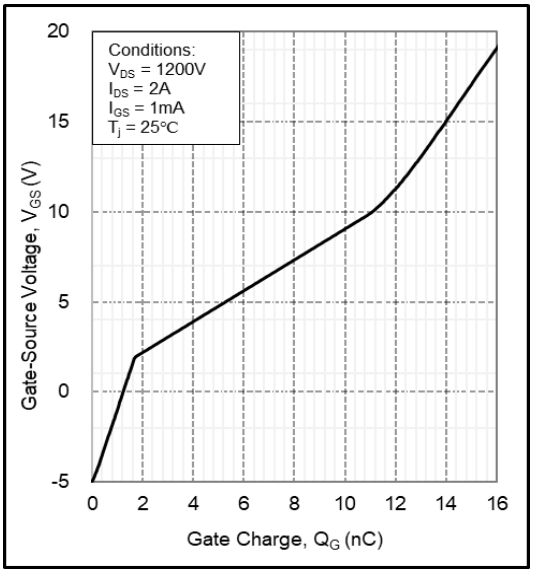


Figure 12. Gate Charge Characteristic



Curve Characteristics(T_J=25℃ unless otherwise specified)

Figure 13. 3rd quadrant characteristic at T_j = -55℃

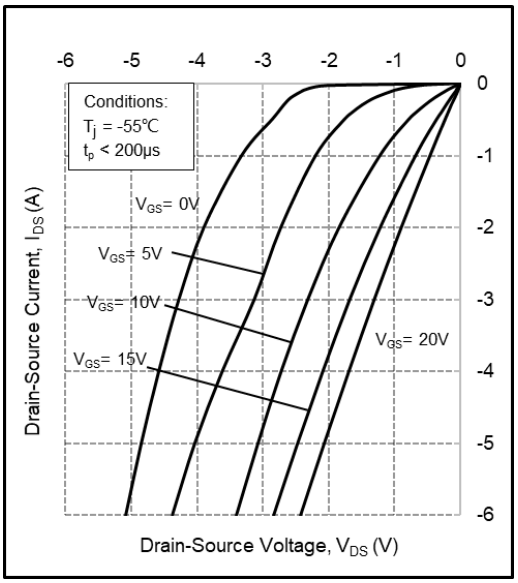


Figure 14. 3rd quadrant characteristic at T_j = 25℃

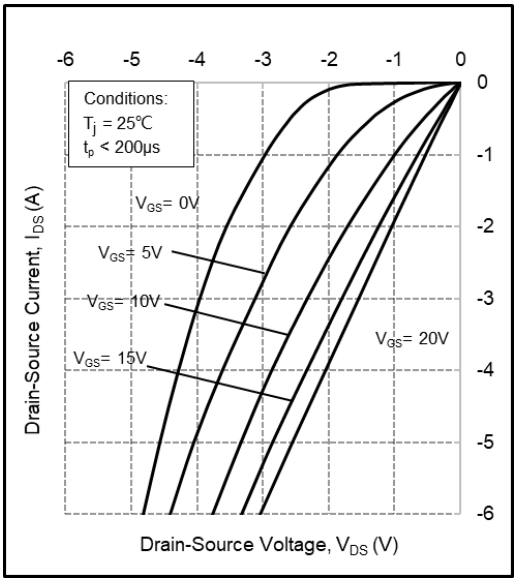


Figure 15. 3rd quadrant characteristic at T_j = 175℃

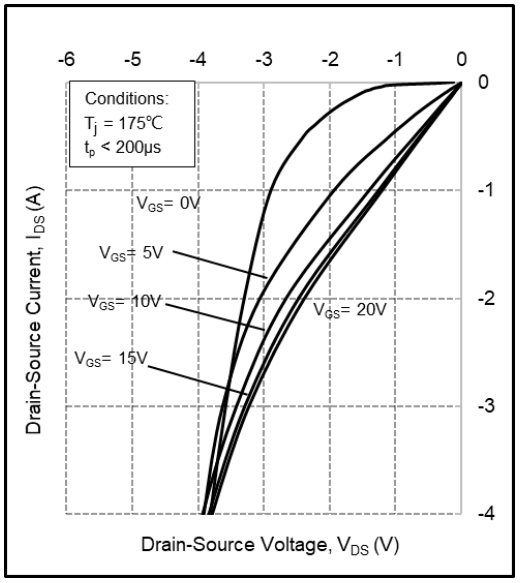


Figure 16. Output capacitor stored energy

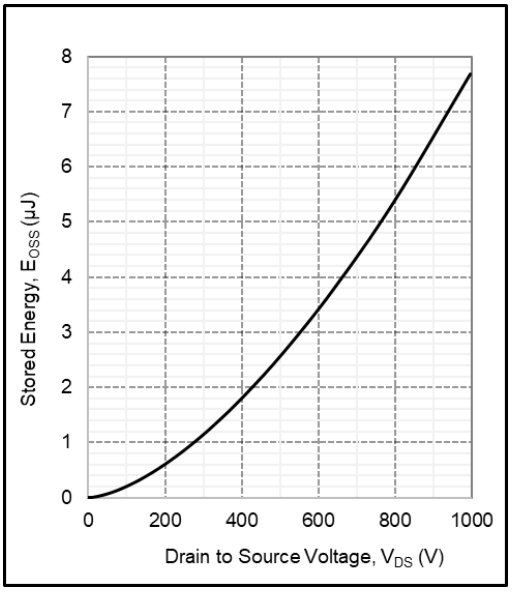


Figure 17. Capacitance vs. drain-source voltage (0 - 200V)

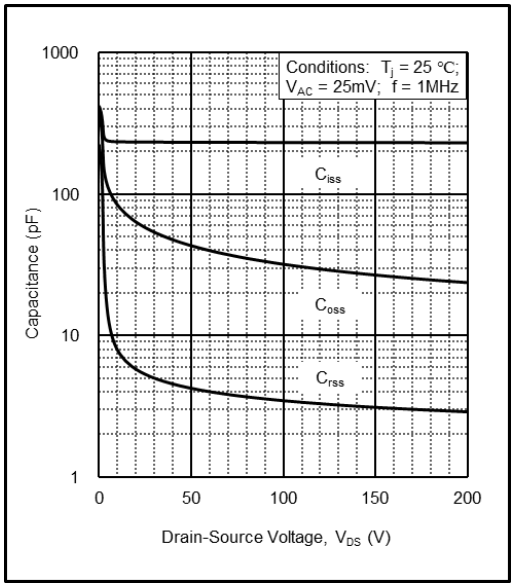
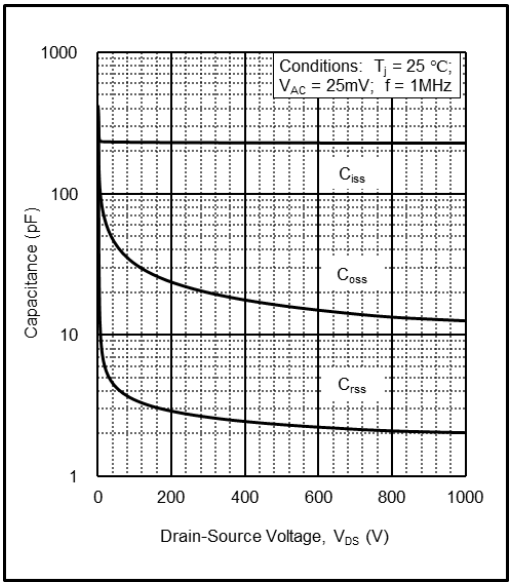


Figure 18. Capacitance vs. drain-source voltage (0 - 1000V)



Curve Characteristics(T_J=25℃ unless otherwise specified)

Figure 19. Continuous drain current derating vs. temperature

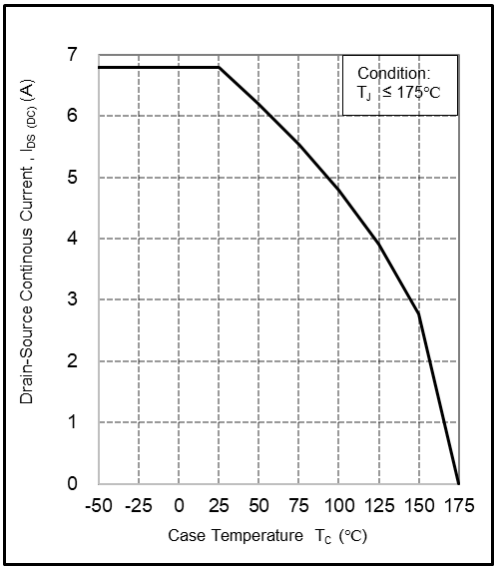


Figure 20. Maximum power dissipation derating vs. temperature

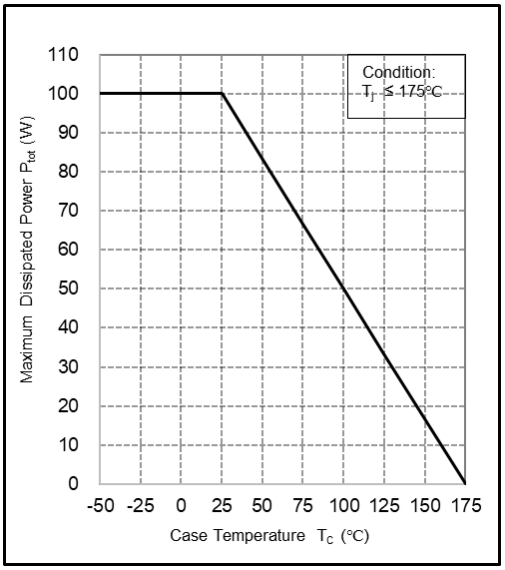


Figure 21. Switching Times vs. $R_{G(ext)}$

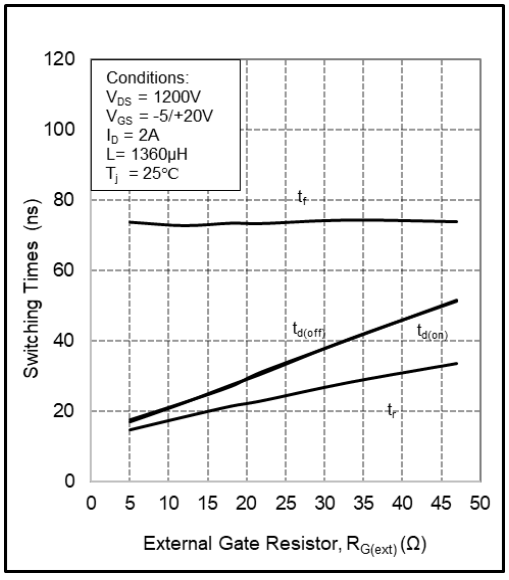


Figure 22. Clamped inductive Switching energy vs. drain current

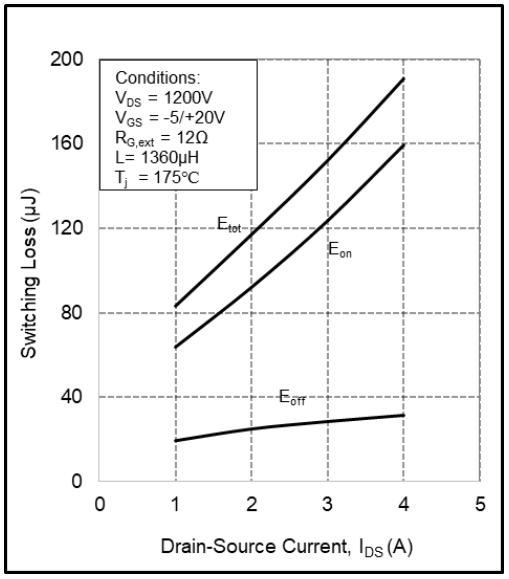


Figure 23. Clamped inductive Switching energy vs. temperature

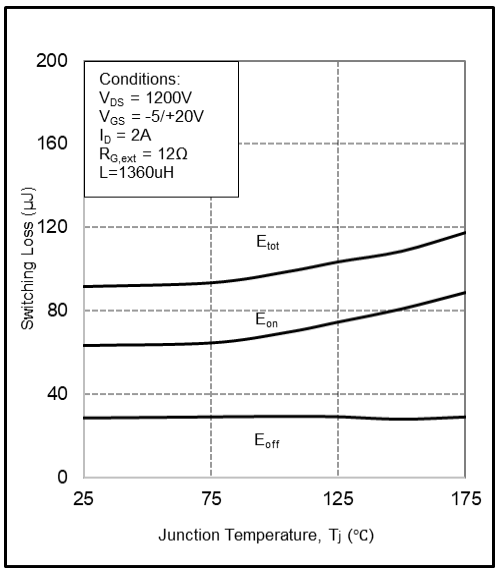
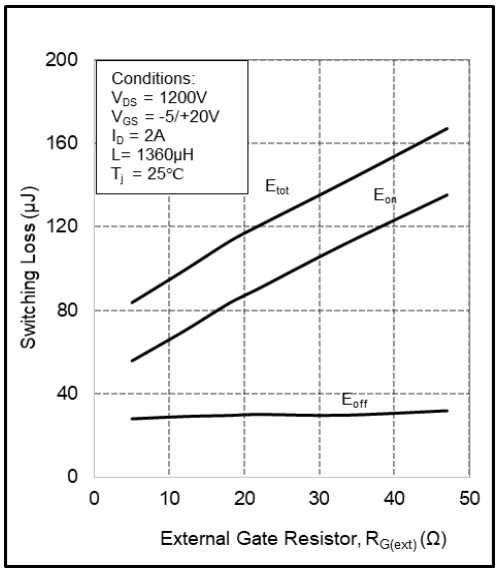


Figure 24. Clamped inductive Switching energy vs. $R_{G(ext)}$



Curve Characteristics (T_J=25℃ unless otherwise specified)

Figure 25. Reverse recovery charge vs. di_f/dt

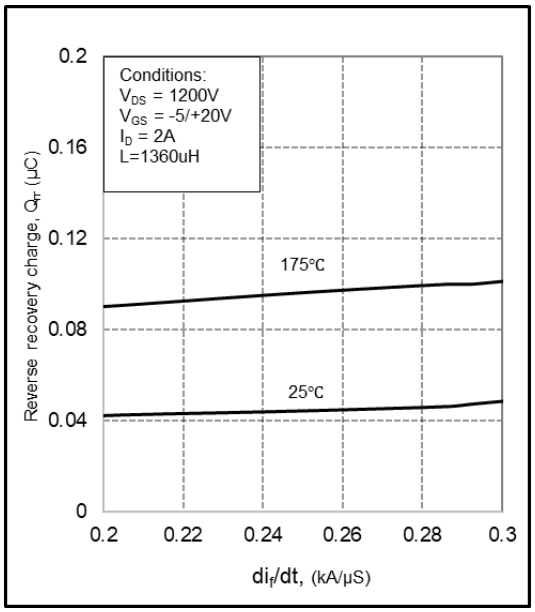


Figure 26. Reverse recovery current vs. di_f/dt

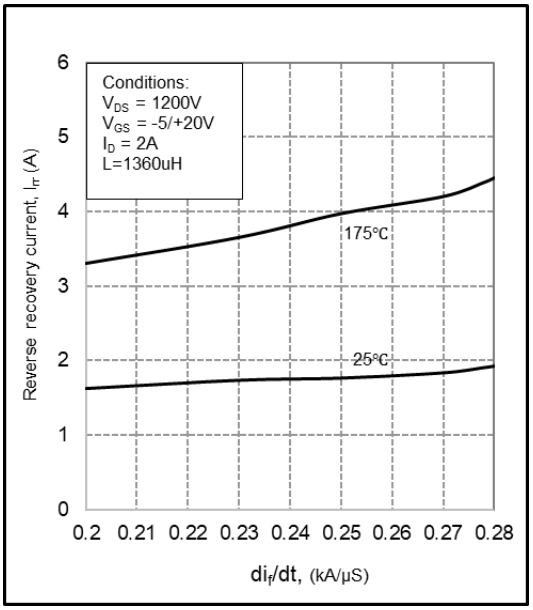


Figure 27. Transient Thermal Impedance (Junction - Case)

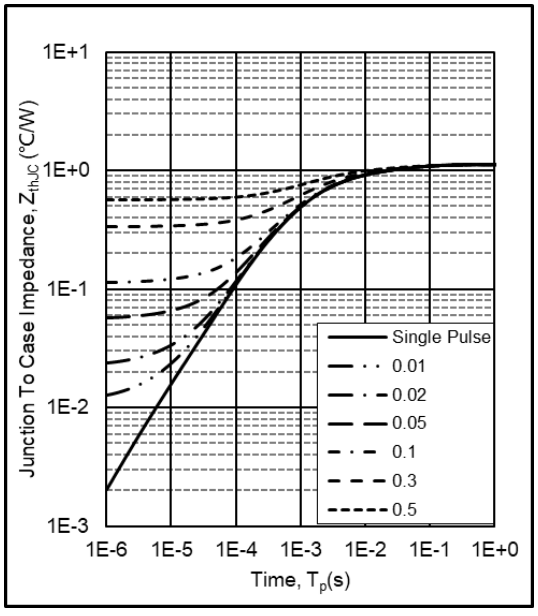
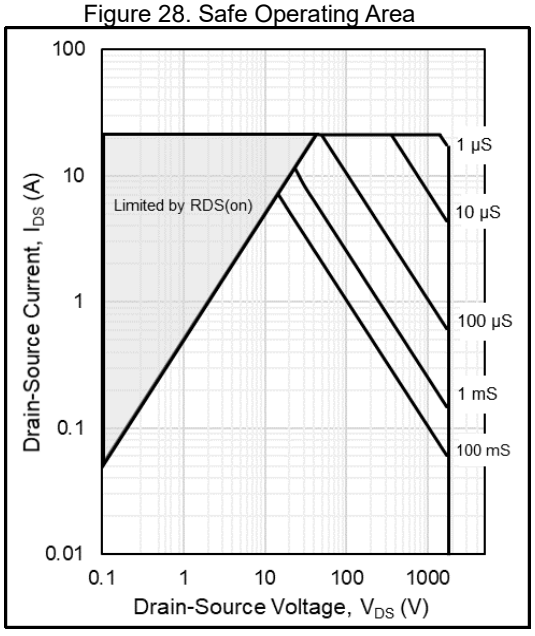


Figure 28. Safe Operating Area



Ordering Information

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