

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D@25^{\circ}C$
1700V	850mΩ@20V	7A

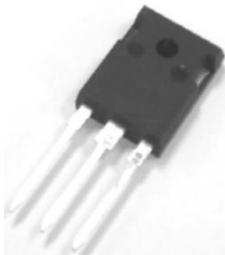
### Feature

- High Blocking Voltage With Low On-Resistance
- High Speed Switching With Low Capacitance
- Easy to Parallel and Simple to Drive
- Ultra-low Drain-gate capacitance
- Avalanche Ruggedness

### Application

- Switch Mode Power Supplies
- Auxiliary Power Supplies
- High-voltage Capacitive

### Package

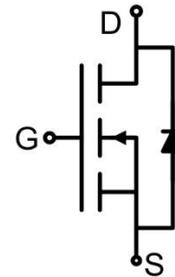


TO-247-3

### Marking



### Circuit diagram



### Absolute maximum ratings ( $T_c=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	$V_{DSmax}$	$V_{GS} = 0V, I_D = 100\mu A$	1700	V
Gate-Source Voltage	$V_{GSmax}$	Absolute maximum values	-10/+25	V
Gate-Source Voltage	$V_{GSOP}$	Recommended operational values	-5/+20	V
Continuous Drain Current	$I_D$	$V_{GS}=20V, T_c=25^{\circ}C$	7	A
	$I_D$	$V_{GS}=20V, T_c=100^{\circ}C$	4.5	A
Power Dissipation	$P_D$	$T_c=25^{\circ}C, T_J=150^{\circ}C$	62	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction-to-Case	1.8	$^{\circ}C/W$
Junction Temperature	$T_J$		-55 ~ +150	$^{\circ}C$
Storage Temperature	$T_{STG}$		-55 ~ +150	$^{\circ}C$

### Electrical characteristics (T<sub>c</sub>=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 100μA	1700			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 1700V, V <sub>GS</sub> = 0V		1	100	μA
Gate-Source leakage current	I <sub>GSS+</sub>	V <sub>GS</sub> = 25V, V <sub>DS</sub> = 0V		10	250	nA
Gate-Source leakage current	I <sub>GSS-</sub>	V <sub>GS</sub> = -10V, V <sub>DS</sub> = 0V		10	250	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA	2.0	2.6	4.0	V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA, T <sub>J</sub> = 150°C		1.8		
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 20V, I <sub>D</sub> = 2A		650	850	mΩ
		V <sub>GS</sub> = 20V, I <sub>D</sub> = 2A, T <sub>J</sub> = 150°C		950		
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 1000V, V <sub>GS</sub> = 0V, f = 1MHz V <sub>AC</sub> = 25mV		198		pF
Output Capacitance	C <sub>oss</sub>			13		
Reverse Transfer Capacitance	C <sub>rss</sub>			2.1		
Turn-on Switching Energy	E <sub>on</sub>	V <sub>DS</sub> = 1200V, V <sub>GS</sub> = -5V/20V, I <sub>D</sub> = 2A, R <sub>G(ext)</sub> = 2.5Ω, L = 1500μH		5		mJ
Turn-off Switching Energy	E <sub>off</sub>			9.2		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 1200V, V <sub>GS</sub> = -5V/20V, I <sub>D</sub> = 2A		23		nC
Gate-Source Charge	Q <sub>gs</sub>			5.4		
Gate-Drain Charge	Q <sub>gd</sub>			7.6		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DS</sub> = 1200V, V <sub>GS</sub> = -5V/20V, I <sub>D</sub> = 2A, R <sub>G(ext)</sub> = 2.5Ω, R <sub>L</sub> = 20Ω		13.8		nS
Turn-on rise time	t <sub>r</sub>			22.8		
Turn-off delay time	t <sub>d(off)</sub>			38		
Turn-off fall time	t <sub>f</sub>			14		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>	T <sub>c</sub> = 25°C			7	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = -5V, I <sub>SD</sub> = 3.5A		4.2		V
		V <sub>GS</sub> = -5V, I <sub>SD</sub> = 3.5A, T <sub>J</sub> = 150°C		3.9		
Reverse Recovery Time	t <sub>rr</sub>	I <sub>SD</sub> = 2A, V <sub>R</sub> = 1200V		25		nS
Reverse Recovery Charge	Q <sub>rr</sub>			15		nC
Peak Reverse Recovery Current	I <sub>rrm</sub>				2.8	

## Typical Characteristics

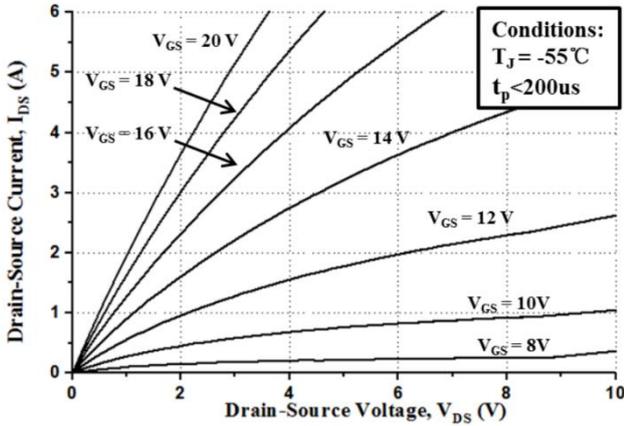


Figure 1. Output Characteristics  $T_J = -55^\circ\text{C}$

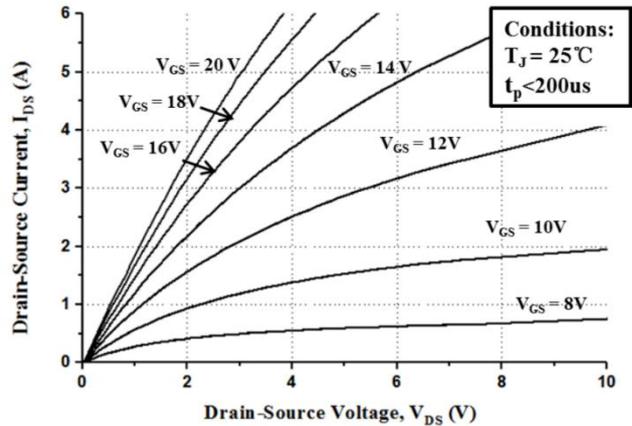


Figure 2. Output Characteristics  $T_J = 25^\circ\text{C}$

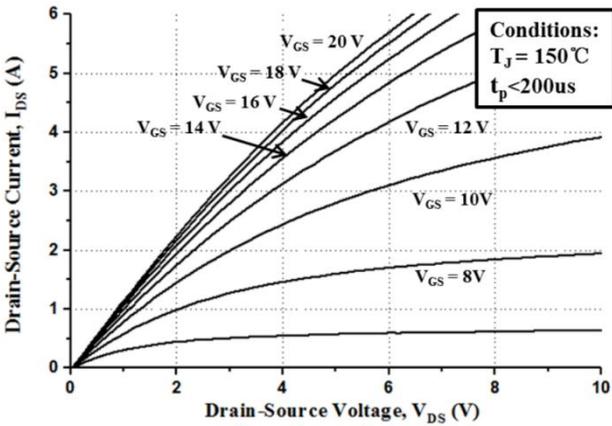


Figure 3. Output Characteristics  $T_J = 150^\circ\text{C}$

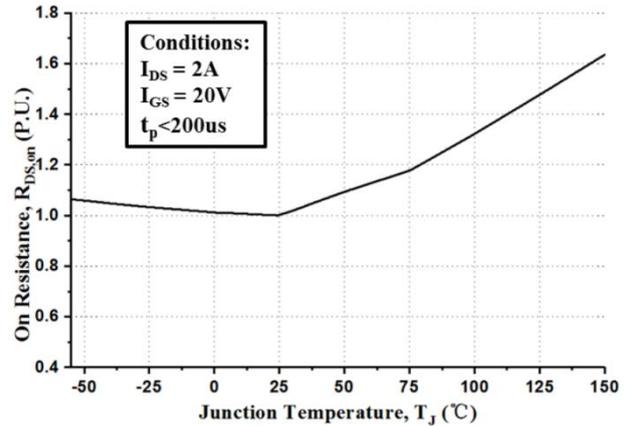


Figure 4. Normalized On-Resistance vs. Temperature

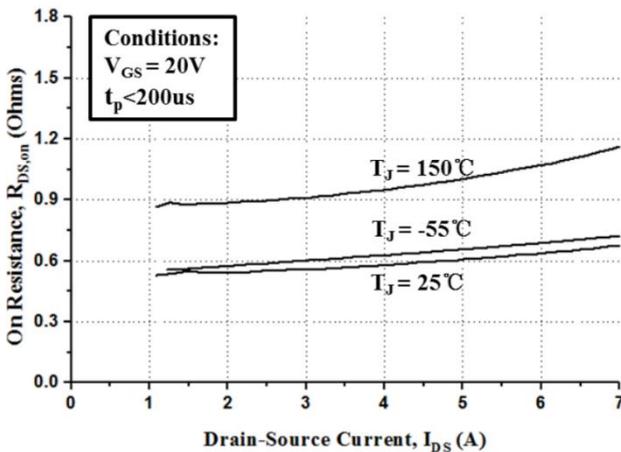


Figure 5. On-Resistance vs. Drain Current  
For Various Temperatures

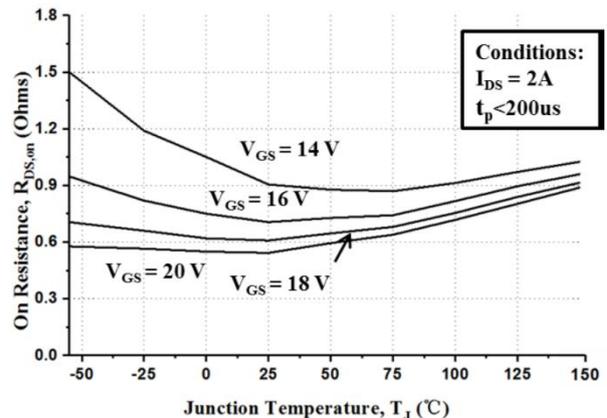


Figure 6. On-Resistance vs. Temperature  
For Various Gate Voltage

## Typical Characteristics

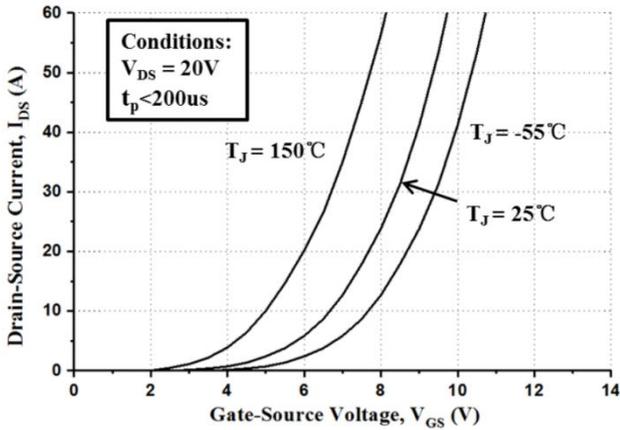


Figure 7. Transfer Characteristic for Various Junction Temperatures

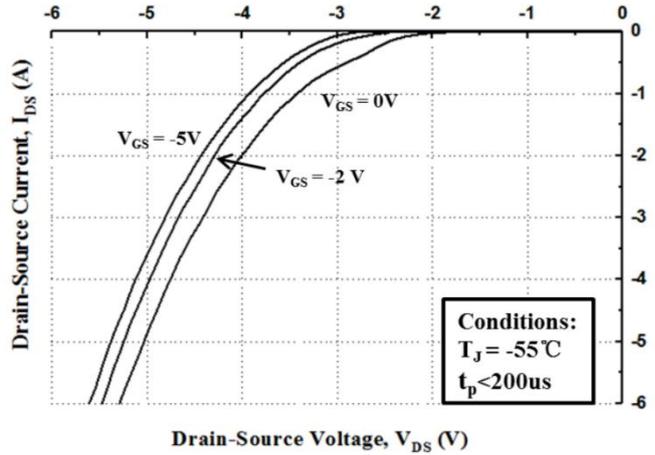


Figure 8. Body Diode Characteristic at -55°C

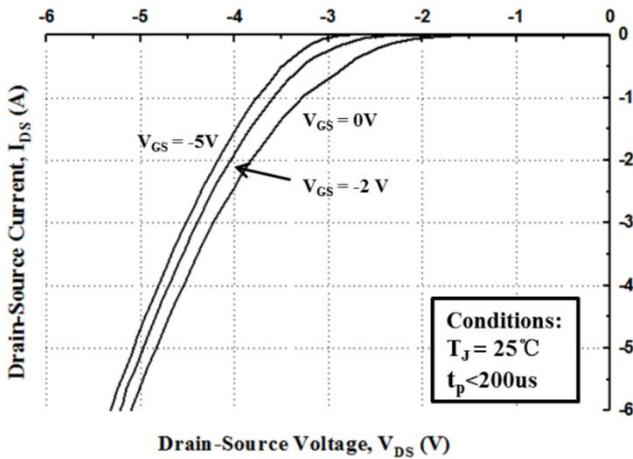


Figure 9. Body Diode Characteristics at 25°C

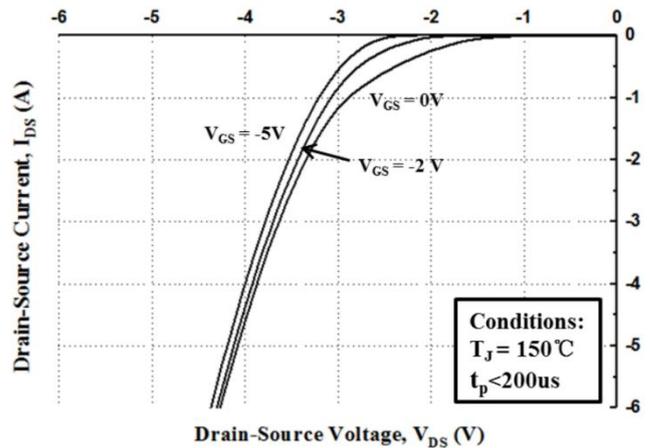


Figure 10. Body Diode Characteristics at 150°C

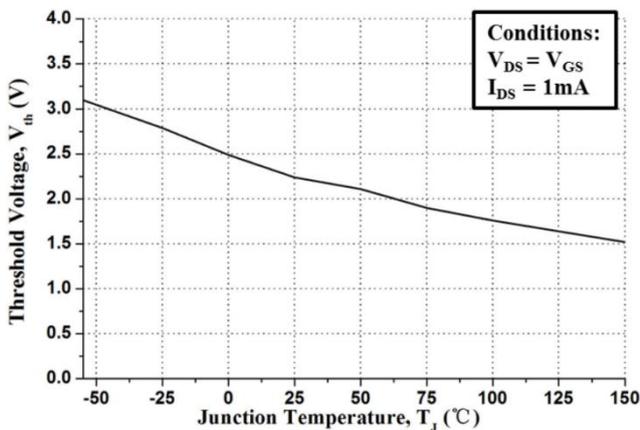


Figure 11. Threshold Voltage vs. Temperature

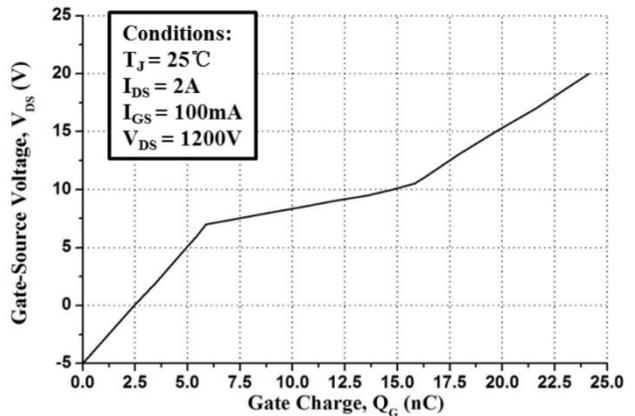


Figure 12. Gate Charge Characteristic

## Typical Characteristics

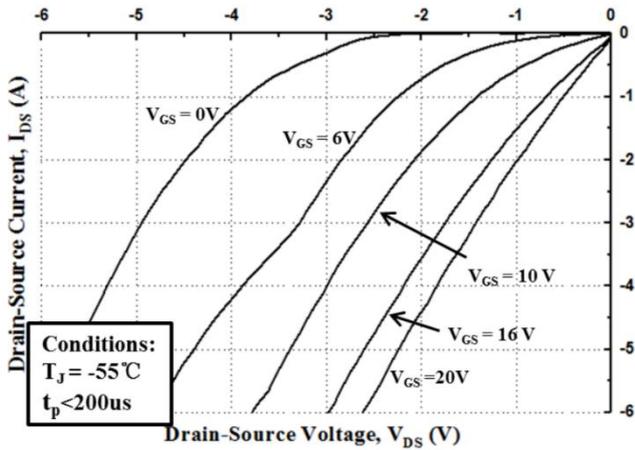


Figure 13. 3rd Quadrant Characteristics at -55°C

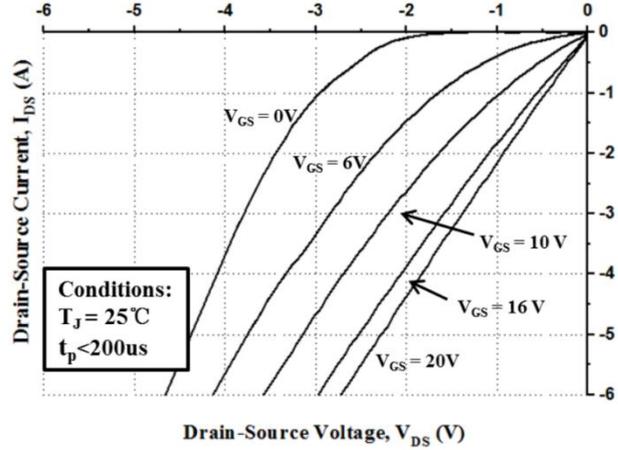


Figure 14. 3rd Quadrant Characteristics at 25°C

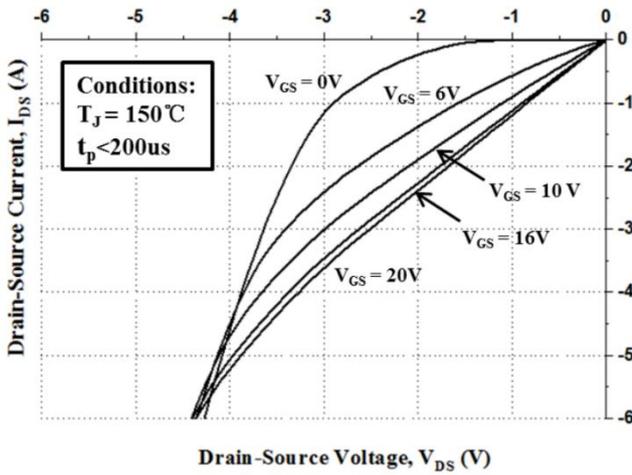


Figure 15. 3rd Quadrant Characteristics at 150°C

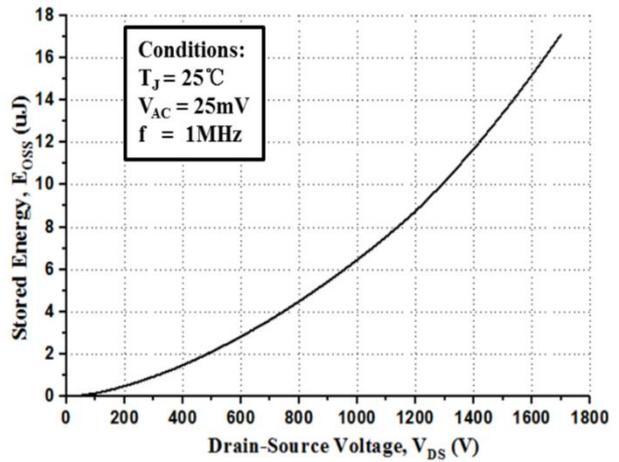


Figure 16. Output Capacitor Stored Energy

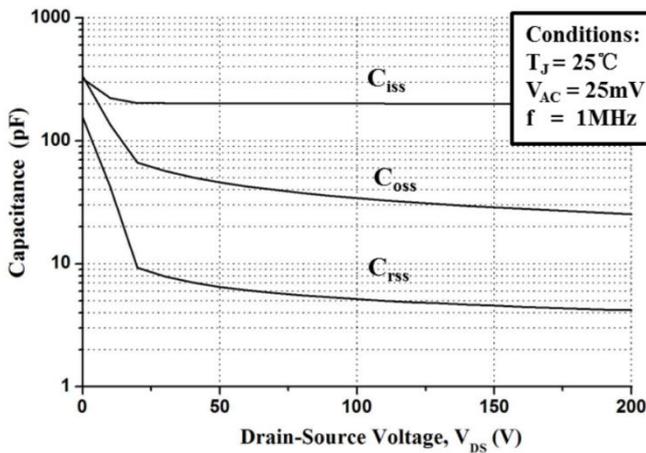


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

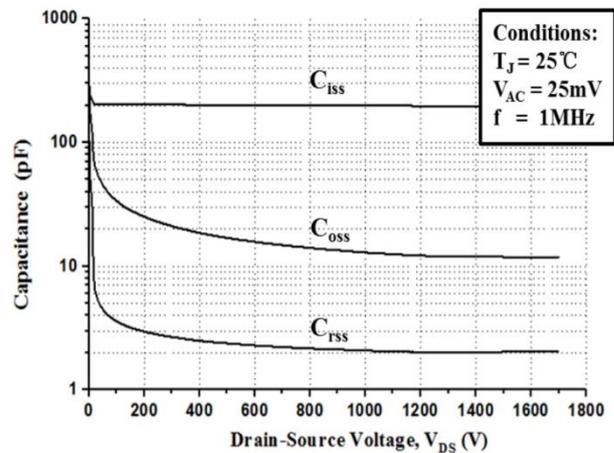


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1700V)

## Typical Characteristics

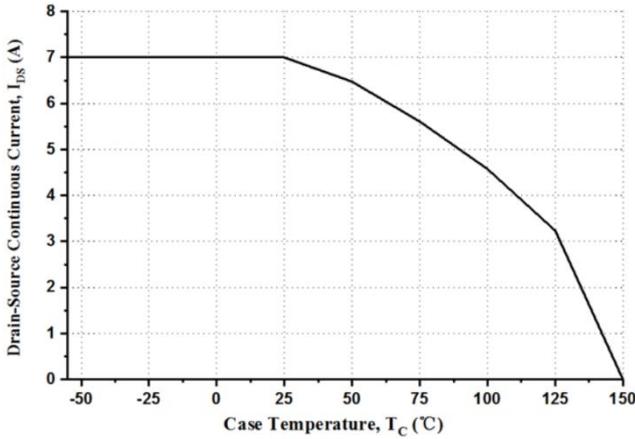


Figure 19. Continuous Drain Current Derating vs. Case Temperature

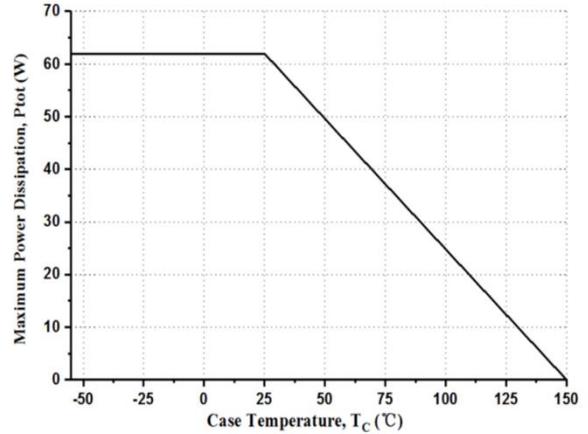


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

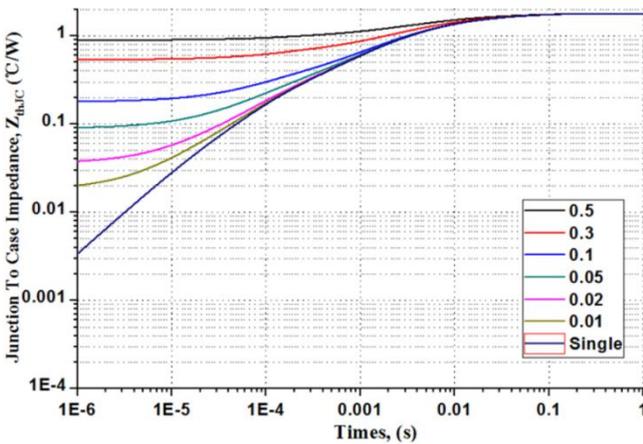


Figure 21. Transient Thermal Impedance (Junction - Case)

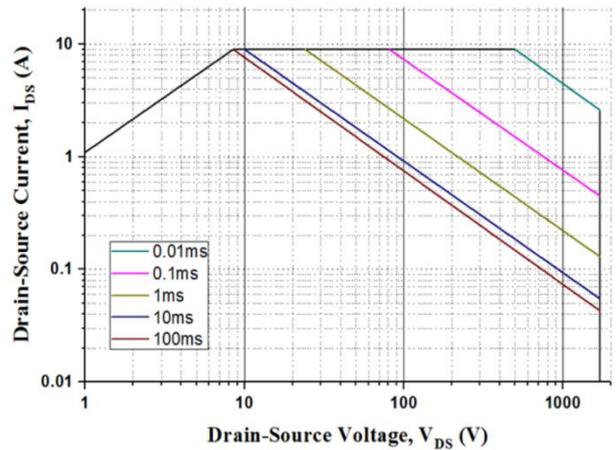
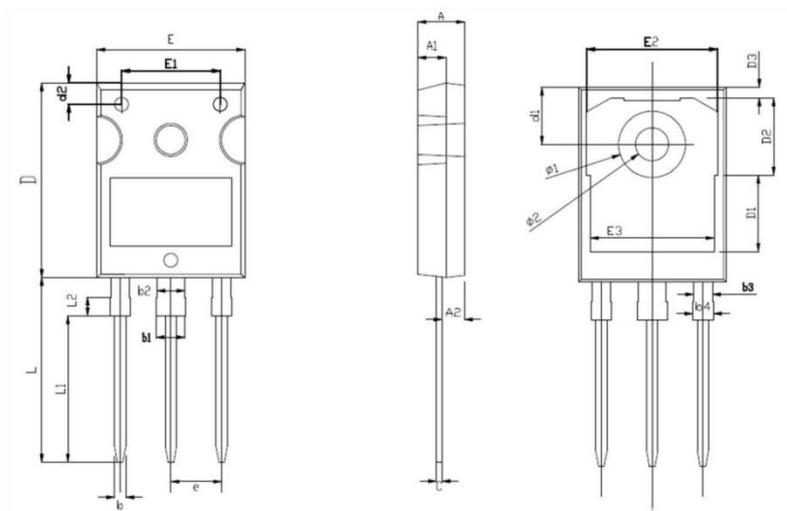


Figure 22. Safe Operating Area

### TO-247-3 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.200	0.189	0.205
A1	2.800	3.200	0.110	0.126
A2	2.260	2.560	0.089	0.101
b	1.100	1.300	0.043	0.051
b1	2.900	3.200	0.114	0.126
b2	2.900	3.100	0.114	0.122
b3	1.900	2.100	0.075	0.083
b4	2.000	2.200	0.079	0.086
c	0.500	0.700	0.020	0.028
D	20.800	21.200	0.819	0.835
D1	8.230 BSC		0.324 BSC	
D2	8.320 BSC		0.328 BSC	
D3	1.170 BSC		0.046 BSC	
d1	6.000	6.300	0.236	0.248
d2	2.200	2.400	0.087	0.094
E	15.600	16.00	0.614	0.630
E1	10.500 BSC		0.413 BSC	
E2	14.020 BSC		0.552 BSC	
E3	13.500 BSC		0.531 BSC	
e	5.340	5.540	0.210	0.218
L	19.720	20.120	0.776	0.792
L1	15.790 BSC		0.621 BSC	
L2	1.980 BSC		0.078 BSC	
φ1	7.100	7.300	0.280	0.287
φ2	3.500	3.700	0.138	0.146