

VDS	RDS(on)	ID@25°C
1200V	140mΩ	17A

**Applications:**

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- EV Charging
- Motor Drives

**Features:**

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness

**Benefits:**

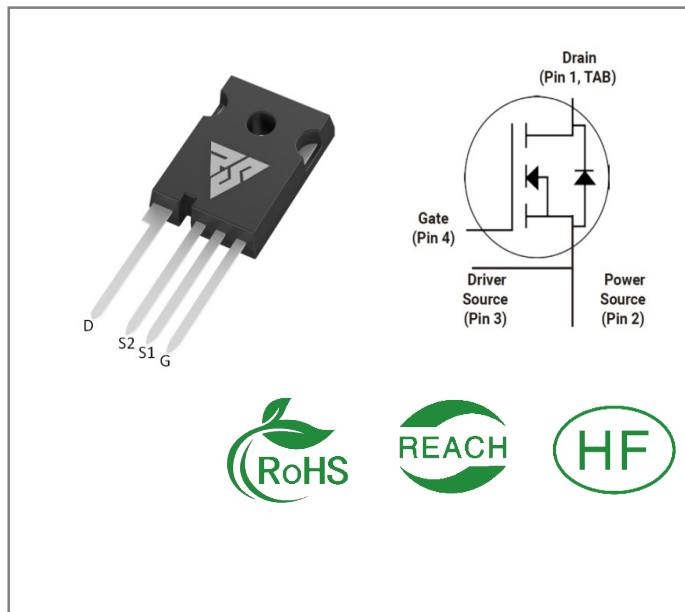
- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RSM120160Z	TO-247-4	RSM120160Z	Tube	30 PCS

**Maximum Ratings** (TJ= 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
VDSmax	Drain - Source Voltage	1200	V	VGS=0V, ID =100μA	
VGSmax	Gate - Source Voltage	-8/+22	V	Absolute maximum values	
VGSop	Gate - Source Voltage	-4/+18	V	Recommended operational values	
ID	Continuous Drain Current	17 12	A	VGS=18V, TC =25°C VGS=18V, TC =100°C	
ID(pulse)	Pulsed Drain Current	39	A	Pulse width tp limited by TJmax	
PD	Power Dissipation	83	W	TC =25°C, TJ =175°C	
TL	Solder Temperature	260	°C		
TJ, Tstg	Operating Junction and Storage Temperature	-55 to +175	°C		



**Electrical Characteristics** (T<sub>J</sub>= 25°C unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions	Note
V(BR)DSS	Drain-Source Breakdown Voltage	1200			V	V <sub>GS</sub> =0V, I <sub>D</sub> =100uA	
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.9	2.6	4.0	V	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>DS</sub> =2.5mA, TC =25°C	
			1.8			V <sub>GS</sub> = V <sub>DS</sub> , I <sub>DS</sub> =2.5mA, TC =175°C	
I <sub>DSS</sub>	Zero Gate Voltage Drain Current		1	100	μA	V <sub>DS</sub> = 1200V, V <sub>GS</sub> =0V	
I <sub>GSS</sub>	Gate-Source Leakage Current		10	250	nA	V <sub>GS</sub> =22V, V <sub>DS</sub> = 0V	
R <sub>DS(on)</sub>	Drain-Source on-state Resistance		140	185	mΩ	V <sub>GS</sub> =18V, I <sub>D</sub> =8.5A, TC =25°C	
			248	300		V <sub>GS</sub> =18V, I <sub>D</sub> =8.5A, TC =175°C	
C <sub>iss</sub>	Input Capacitance		612		pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =1000 V, f=1MHz, V <sub>AC</sub> =25 mV	
C <sub>oss</sub>	Output Capacitance		34.5				
C <sub>rss</sub>	Reverse Transfer Capacitance		8.77				
E <sub>ON</sub>	Turn-On Switching Energy		305		μJ	V <sub>DS</sub> =800V, V <sub>GS</sub> =-4/18V, I <sub>D</sub> =8.5A, R <sub>G(ext)</sub> = 2.5Ω, L= 100μH	
E <sub>OFF</sub>	Turn-Off Energy		48				
t <sub>d(on)</sub>	Turn-On Delay Time		7		ns	V <sub>DS</sub> =800V, V <sub>GS</sub> =-4/18 V, I <sub>D</sub> = 8.5A, R <sub>G(ext)</sub> =2. 5 Ω , R <sub>L</sub> =20Ω	
t <sub>r</sub>	Rise Time		30				
t <sub>d(off)</sub>	Turn-Off Delay Time		16				
t <sub>f</sub>	Fall Time		22				
R <sub>G(int)</sub>	Internal Gate Resistance		5		Ω	f=1 MHz, V <sub>AC</sub> =25mV	
Q <sub>gs</sub>	Gate to Source Charge		7.8		nC	V <sub>DS</sub> =800V, V <sub>GS</sub> =-4/18V, I <sub>D</sub> =8.5A	
Q <sub>gd</sub>	Gate to Drain Charge		12.1				
Q <sub>g</sub>	Total Gate Charge		42.5				

**Reverse Diode Characteristics** (T<sub>J</sub>= 25°C unless otherwise specified)

Symbol	Parameter	Typ.	Max	Unit	Test Conditions	Note
VSD	Diode Forward Voltage	4.2		V	V <sub>GS</sub> =-4V, I <sub>SD</sub> = 4.2A, T <sub>J</sub> = 25°C	
		3.9		V	V <sub>GS</sub> =-4V, I <sub>SD</sub> = 4.2 A, T <sub>J</sub> = 175°C	
I <sub>S</sub>	Continuous Diode Forward Current		17	A	T <sub>C</sub> = 25°C	
trr	Reverse Recovery time	20		ns	I <sub>SD</sub> = 8.5 A, V <sub>R</sub> = 800V	
Q <sub>rr</sub>	Reverse Recovery Charge	29		nC		
I <sub>rrm</sub>	Peak Reverse Recovery Current	2.5		A		

**Thermal Characteristics** (T<sub>J</sub>= 25°C unless otherwise specified)

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
R <sub>θJC</sub>	Thermal Resistance from Junction to Case	1.75	°C/W		
R <sub>θJA</sub>	Thermal Resistance From Junction to Ambient	40			

Typical Feature Curve

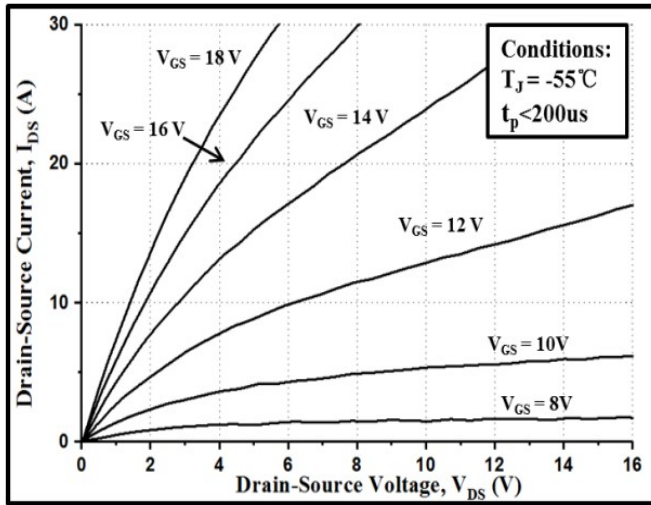


Figure 1. Output Characteristics  $T_J = -55^\circ\text{C}$

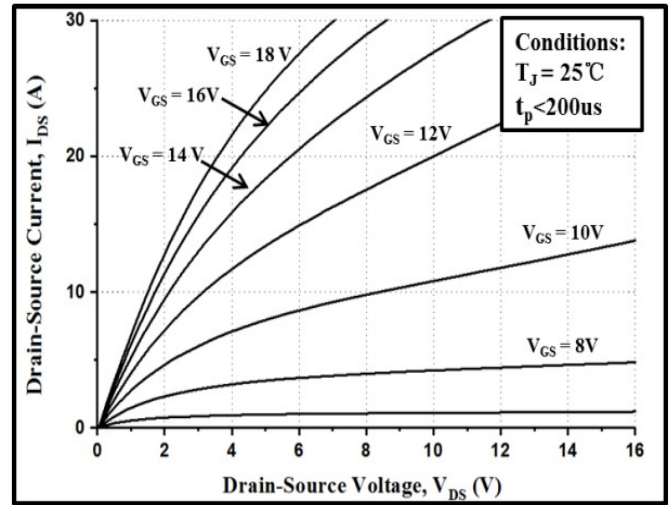


Figure 2. Output Characteristics  $T_J = 25^\circ\text{C}$

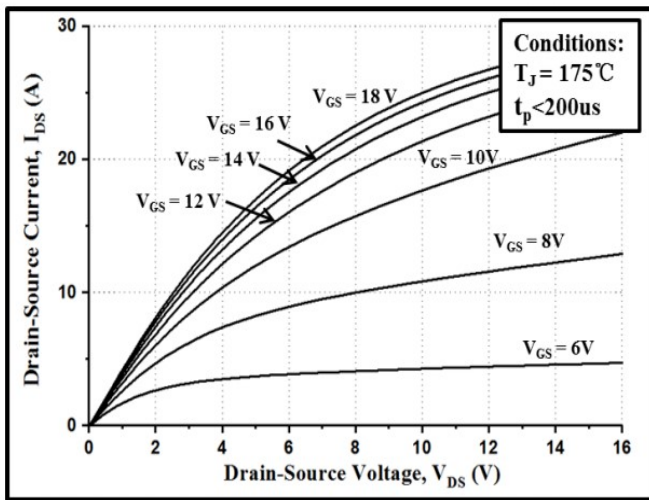


Figure 3. Output Characteristics  $T_J = 175^\circ\text{C}$

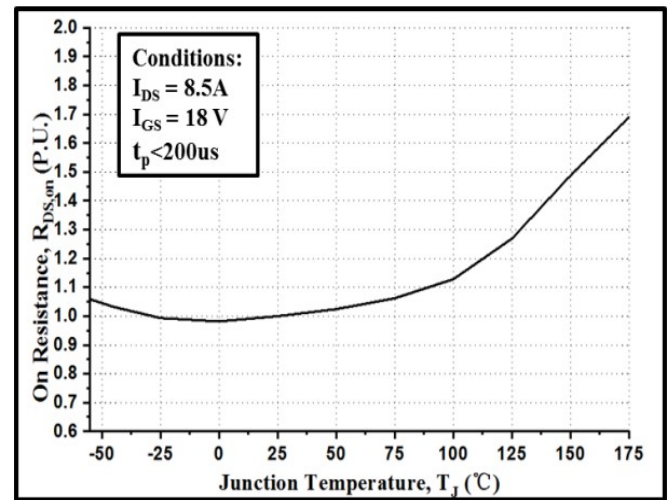


Figure 4. Normalized On-Resistance vs. Temperature

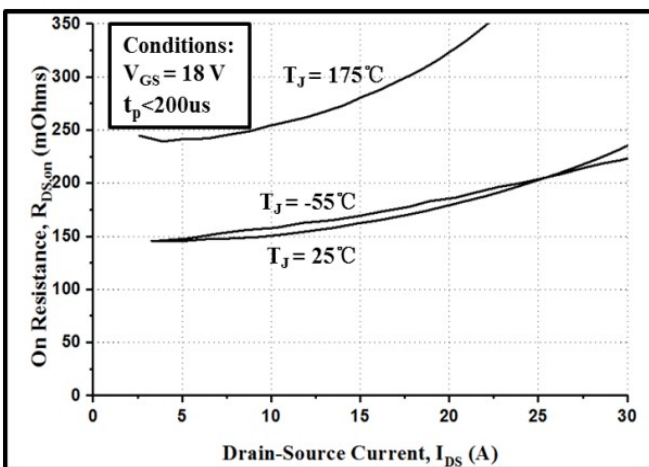


Figure 5. On-Resistance vs. Drain Current  
For Various Temperatures

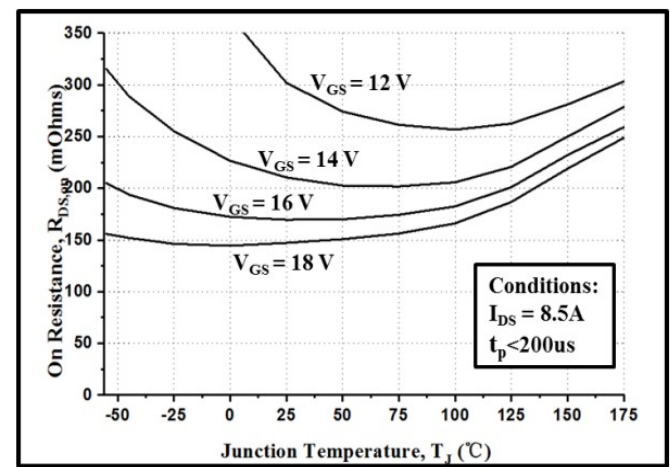


Figure 6. On-Resistance vs. Temperature  
For Various Gate Voltage



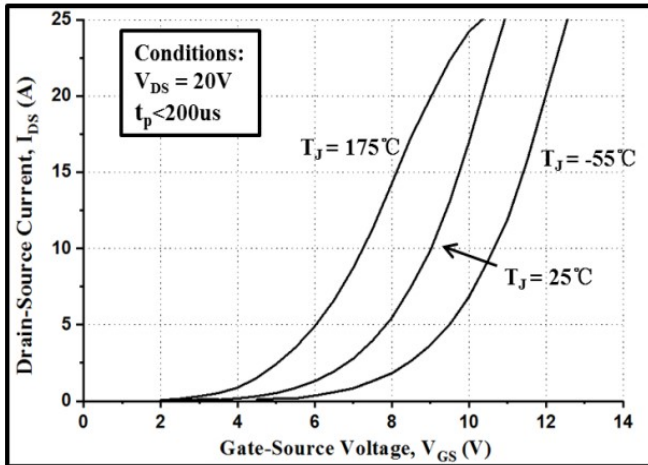


Figure 7. Transfer Characteristic for Various Junction Temperatures

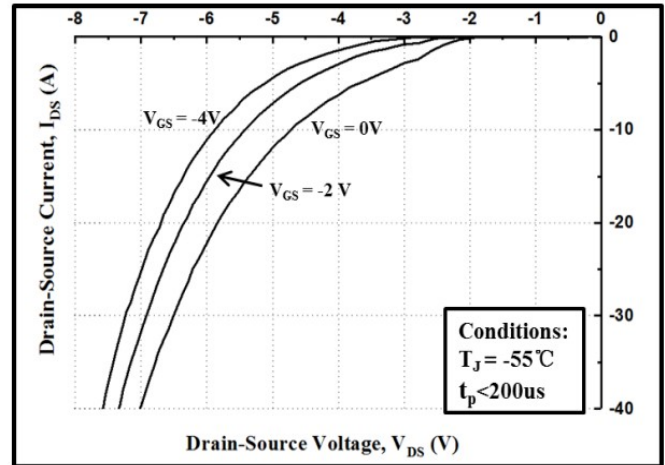


Figure 8. Body Diode Characteristic at  $-55^\circ C$

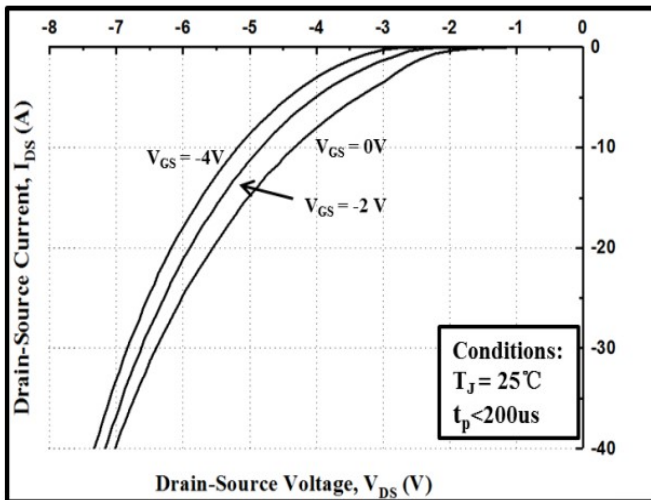


Figure 9. Body Diode Characteristic at  $25^\circ C$

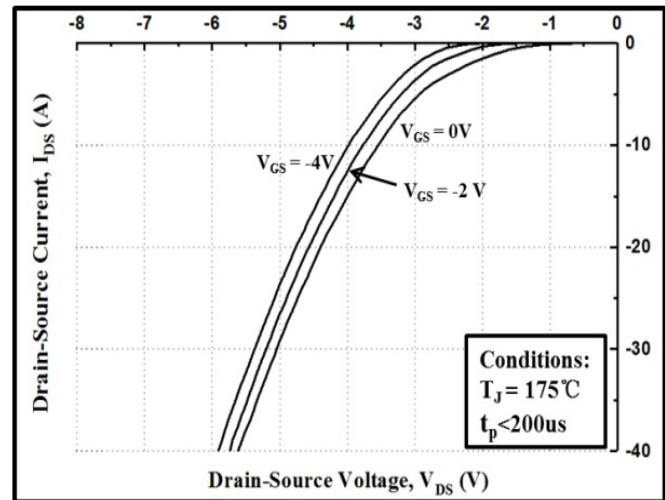


Figure 10. Body Diode Characteristic at  $175^\circ C$

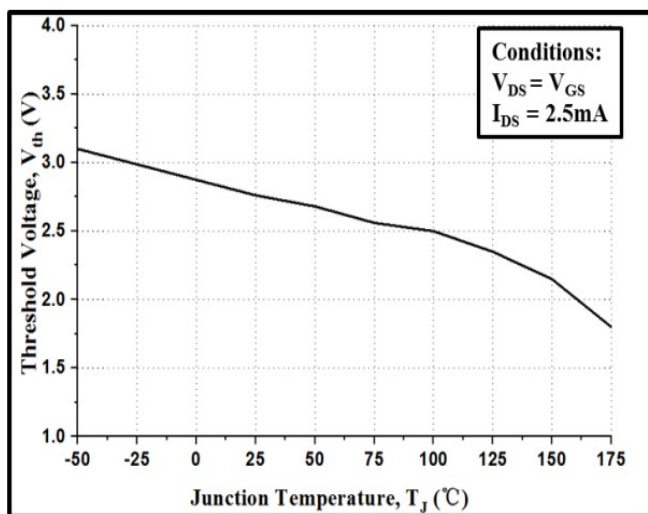


Figure 11. Threshold Voltage vs. Temperature

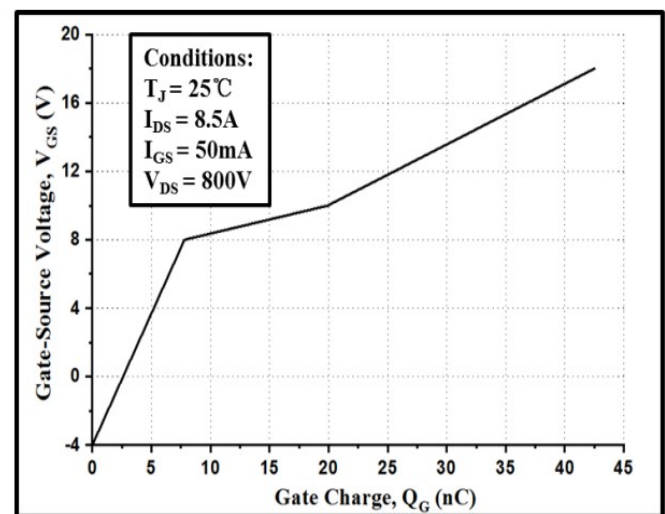


Figure 12. Gate Charge Characteristics

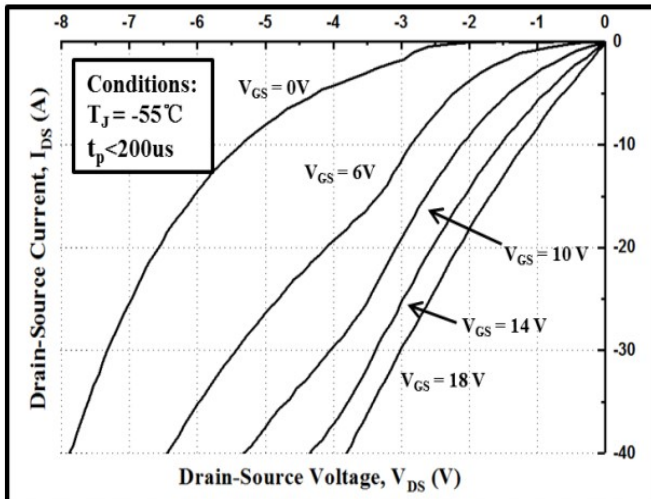


Figure 13. 3rd Quadrant Characteristic at -55°C

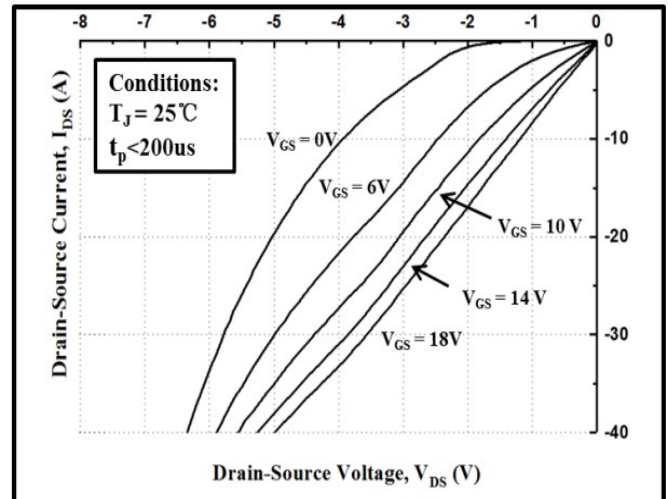


Figure 14. 3rd Quadrant Characteristic at 25°C

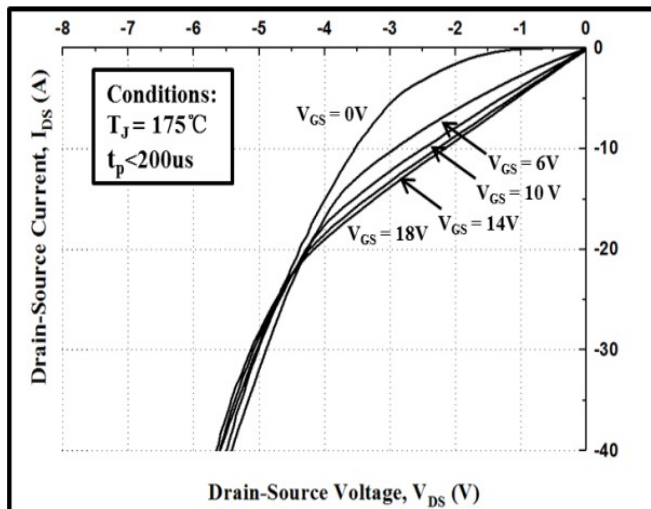


Figure 15. 3rd Quadrant Characteristic at 175 °C

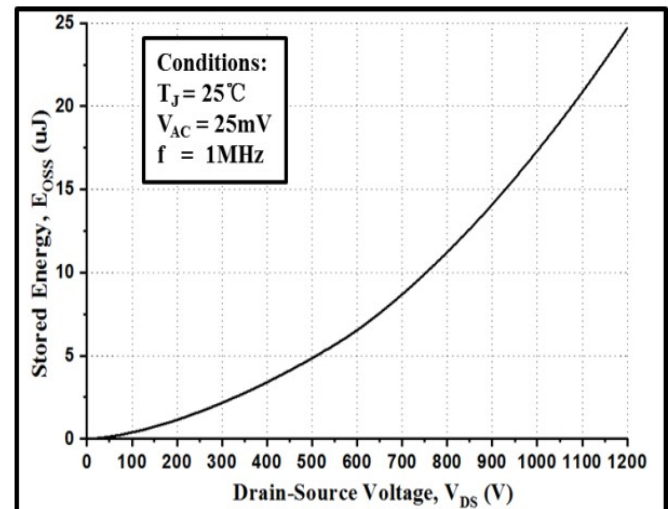


Figure 16. Output Capacitor Stored Energy

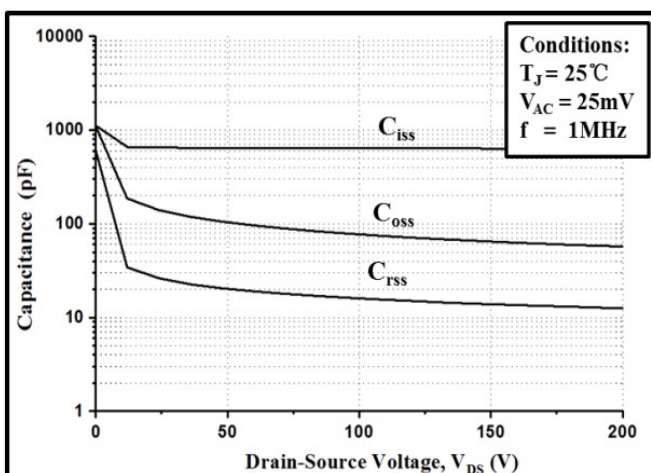


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

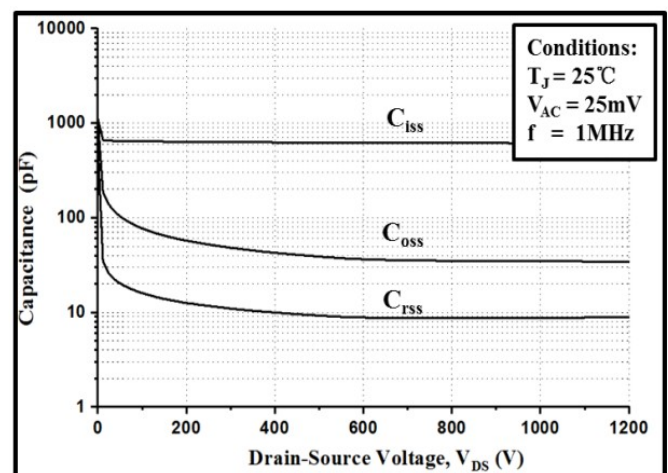


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1200V)

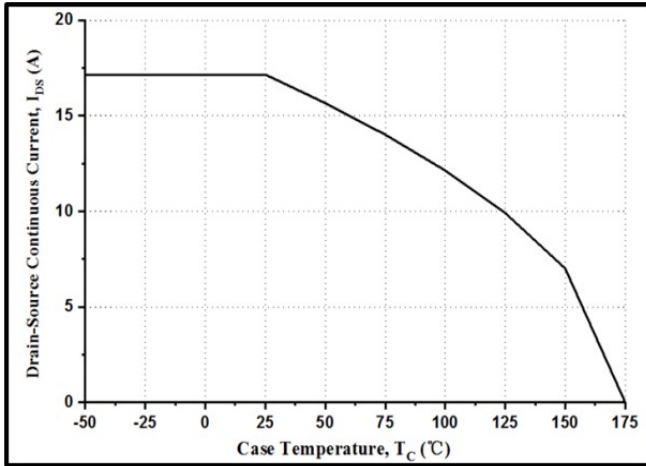


Figure 19. Continuous Drain Current Derating vs. Case Temperature

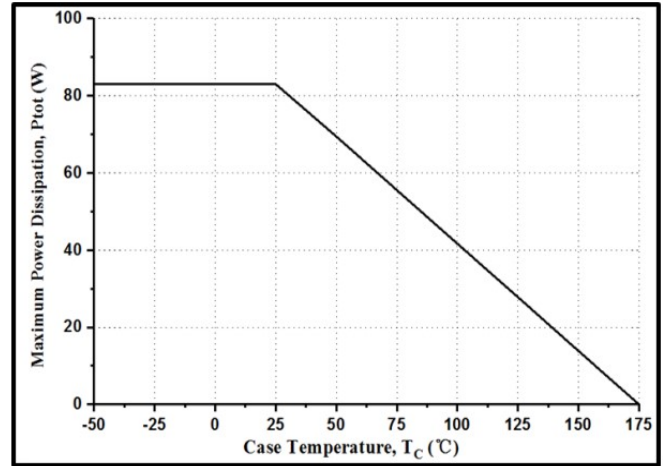


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

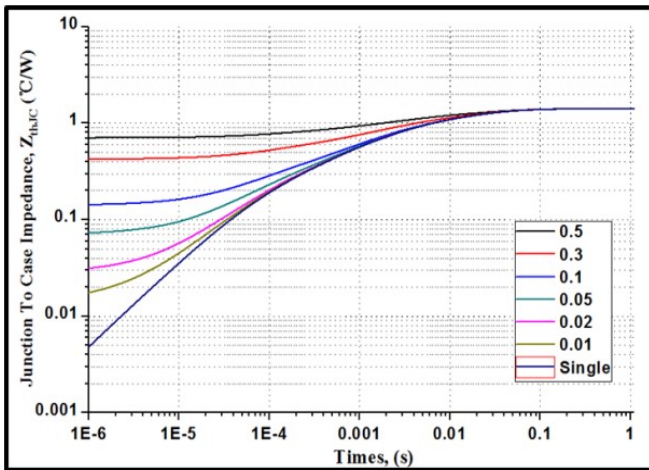


Figure 21. Transient Thermal Impedance (Junction - Case)

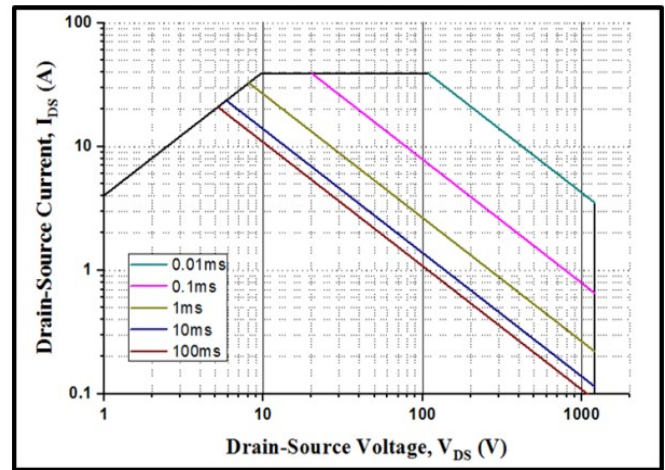
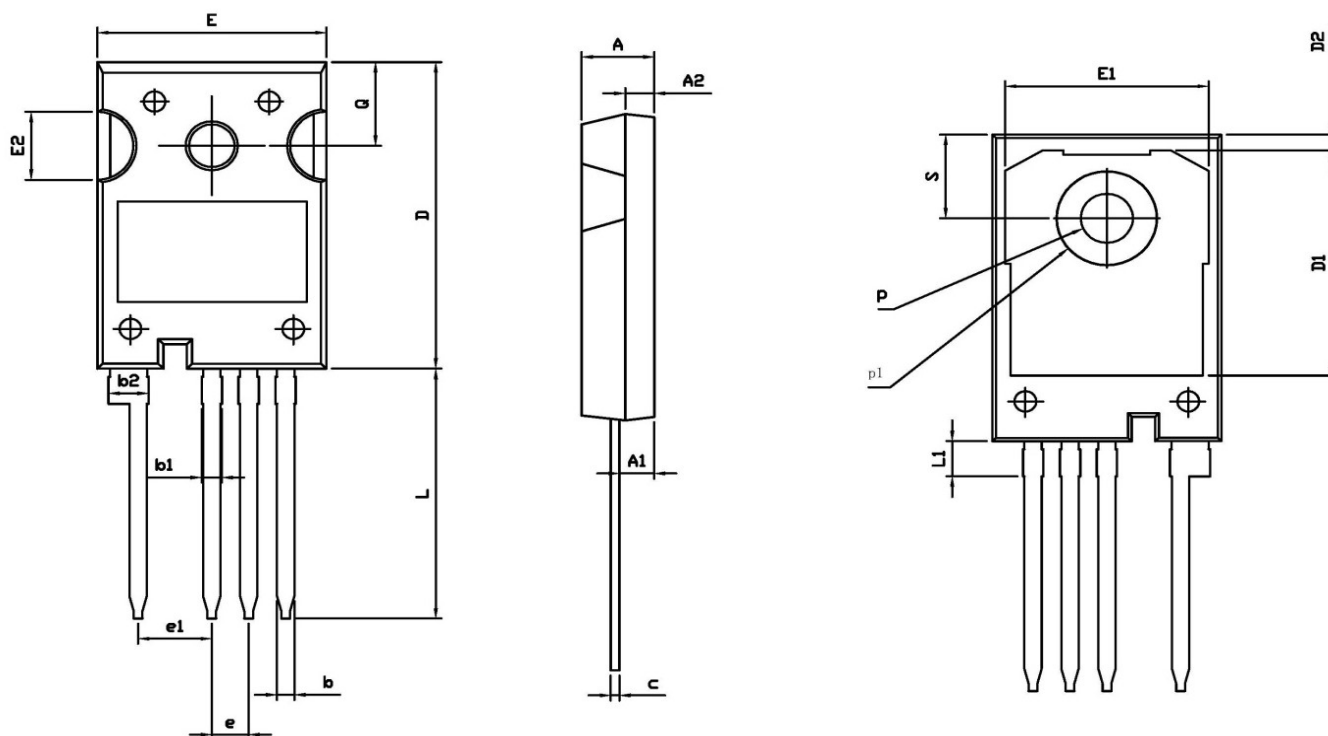
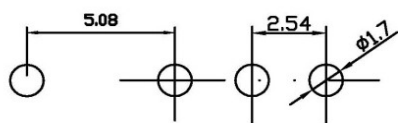


Figure 22. Safe Operating Area



**Package outline drawing(TO-247-4 Unit: mm )**

**RECOMMENDED LAND PATTERN**


UNIT: mm

	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.25	2.40	2.45
A2	1.85	2.00	2.15
b	1.05	1.20	1.35
b1	1.00	1.30	1.60
b2	2.35	2.65	2.95
c	0.50	0.60	0.70
D	22.34	22.54	22.74
D1	16.00	16.50	17.00
D2	0.97	1.17	1.37
e	2.34	2.54	2.74
e1	4.88	5.08	5.28
E	15.60	15.80	16.00
E1	13.50	14.00	14.50
E2	4.80	5.00	5.20
L	18.08	18.38	18.68
L1	2.38	2.58	2.78
p	3.50	3.60	3.70
p1	6.60	6.80	7.00
Q	6.00	6.15	6.30
S	6.00	6.15	6.30

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