

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Halogen Free, RoHS Compliant

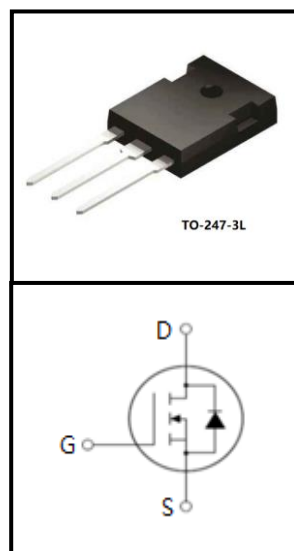
Benefits

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

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power applications

Package



Maximum Ratings ($T_C = 25^\circ\text{C}$ Unless Otherwise Specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{DS\max}$	Drain-Source Voltage	1700	V	$V_{GS} = 0\text{ V}$, $I_D = 100\text{ }\mu\text{A}$	
$V_{GS\max}$	Gate-Source Voltage	-10/+25	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5/+20	V	Recommended operating values	
$I_D^{[1]}$	Drain Current (Continuous)	7.4 5.2	A	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	
$I_{DM}^{[2]}$	Drain Current (Pulsed)	19	A		
P_{TOT}	Total Power Dissipation	81	W	$T_C = 25^\circ\text{C}$, $T_J = 175^\circ\text{C}$	Fig. 6
T_{stg}, T_J	Storage and Operating Junction Temperature Range	-55 to +175	$^\circ\text{C}$		

[1] I_D is limited by package.

[2] Pulse width is limited by Safe Operating Area (SOA).

Electrical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1700			V	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$	
I_{DSS}	Zero Gate Voltage Drain Current		1	100	μA	$V_{GS} = 0\text{ V}, V_{DS} = 1700\text{ V}$	
I_{GSS+}	Gate-Source Leakage Current			200	nA	$V_{DS} = 0\text{ V}, V_{GS} = +25\text{ V}$	
I_{GSS-}	Gate-Source Leakage Current			200	nA	$V_{DS} = 0\text{ V}, V_{GS} = -10\text{ V}$	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	3.0	4.0	V	$V_{GS} = V_{DS}, I_D = 1\text{ mA}, T_J = 25^\circ\text{C}$	Fig. 14
			2.1			$V_{GS} = V_{DS}, I_D = 1\text{ mA}, T_J = 175^\circ\text{C}$	
$R_{DS(on)}$	Static Drain-Source On-Resistance		650	850	m Ω	$V_{GS} = 20\text{ V}, I_D = 2\text{ A}, T_J = 25^\circ\text{C}$	Fig. 15
			1130			$V_{GS} = 20\text{ V}, I_D = 2\text{ A}, T_J = 175^\circ\text{C}$	
C_{iss}	Input Capacitance		285		pF	$V_{DS} = 1200\text{ V}, f = 1\text{ MHz}, V_{GS} = 0\text{ V}$	Fig. 8
C_{oss}	Output Capacitance		13.5				
C_{rss}	Reverse Transfer Capacitance		3.3				
Q_g	Total Gate Charge		23.8		nC	$V_{DD} = 1200\text{ V}, V_{GS} = -5/20\text{ V}, I_D = 2\text{ A}$	Fig. 7
Q_{gs}	Gate-Source Charge		6.7				
Q_{gd}	Gate-Drain Charge		6.5				
$R_{G(int)}$	Gate Input Resistance		43.8		Ω	$f = 1\text{ MHz}, I_D = 0\text{ A}$	
E_{on}	Turn-On Switching Energy		79.7		μJ	$V_{DD} = 1200\text{ V}, I_D = 2\text{ A}, R_G = 5.1\text{ }\Omega, V_{GS} = -5/20\text{ V}$	Fig. 12
E_{off}	Turn-Off Switching Energy		34.2				
$t_{d(on)}$	Turn-On Delay Time		6.7		ns	$V_{DD} = 1200\text{ V}, I_D = 2\text{ A}, R_G = 5.1\text{ }\Omega, V_{GS} = -5/20\text{ V}$	
t_r	Rise Time		13.4				
$t_{d(off)}$	Turn-Off Delay Time		16				
t_f	Fall Time		88				

Reverse SiC Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.3		V	$V_{GS} = -5\text{ V}, I_{SD} = 1\text{ A}, T_J = 25^\circ\text{C}$	Fig. 16
		3.0			$V_{GS} = -5\text{ V}, I_{SD} = 1\text{ A}, T_J = 175^\circ\text{C}$	Fig. 17
$I_{SD}^{[1]}$	Continuous Diode Forward Current		18	A	$T_C = 25^\circ\text{C}$	
			9		$T_C = 100^\circ\text{C}$	
t_{rr}	Reverse Recovery Time	43		ns	$I_{SD} = 2\text{ A}, di/dt = 1200\text{ A}/\mu\text{s}, V_{DD} = 1200\text{ V}, V_{GS} = -5\text{ V}$	
Q_{rr}	Reverse Recovery Charge	86		nC		
I_{RRM}	Peak Reverse Recovery Current	4.2		A		

[1] I_{SD} is limited by bonding wires.

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
R_{thJC}	Thermal Resistance from Junction to Case	1.85	$^{\circ}\text{C/W}$		Fig. 2
R_{thJA}	Thermal Resistance From Junction to Ambient	40			

Electrical Characteristics (Curves)

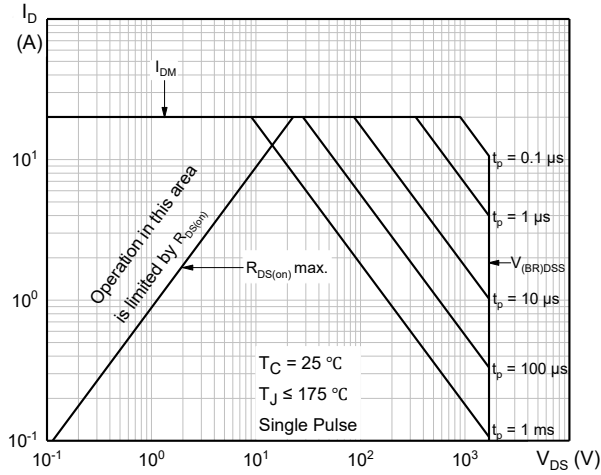


Figure 1. Safe Operating Area

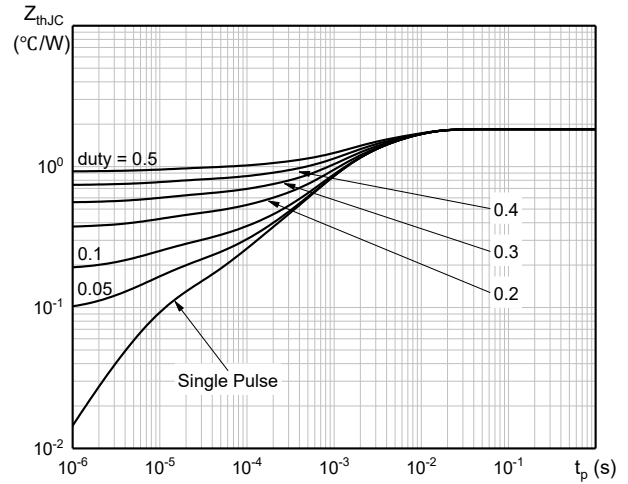


Figure 2. Maximum Transient Thermal Impedance

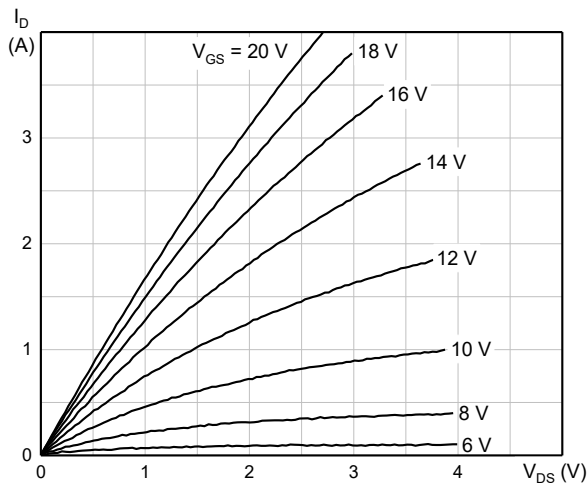
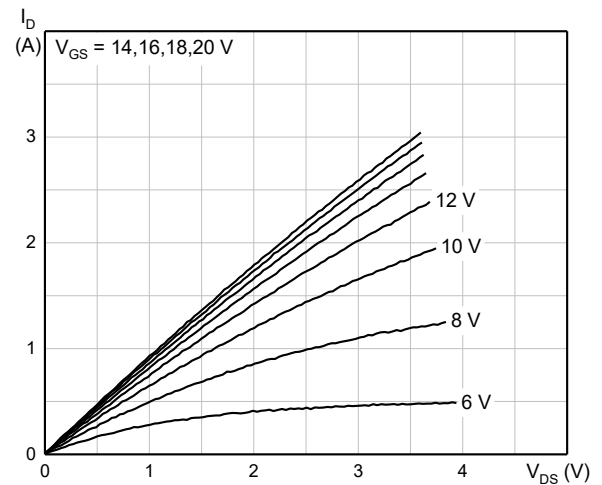
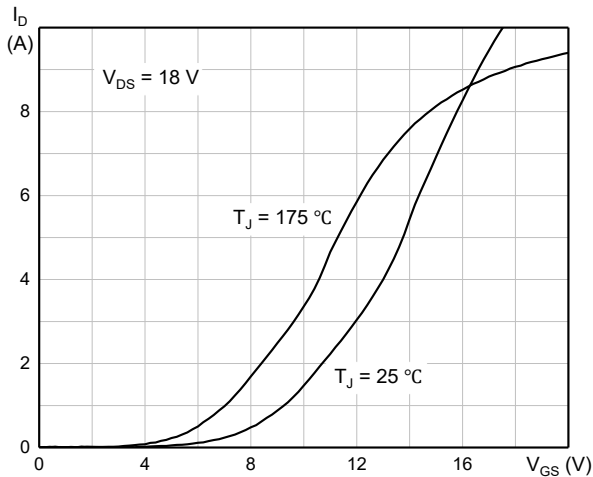

Figure 3. Typical Output Characteristics, $T_J = 25^{\circ}\text{C}$

Figure 4. Typical Output Characteristics, $T_J = 175^{\circ}\text{C}$


Figure 5. Typical Transfer Characteristics

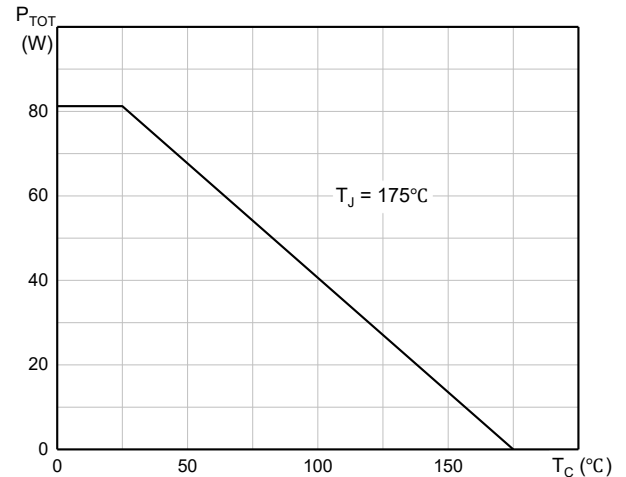


Figure 6. Total Power Dissipation

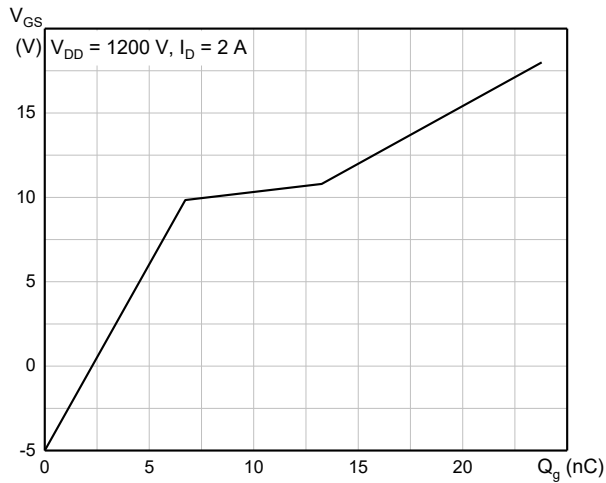


Figure 7. Typical Gate Charge Characteristics

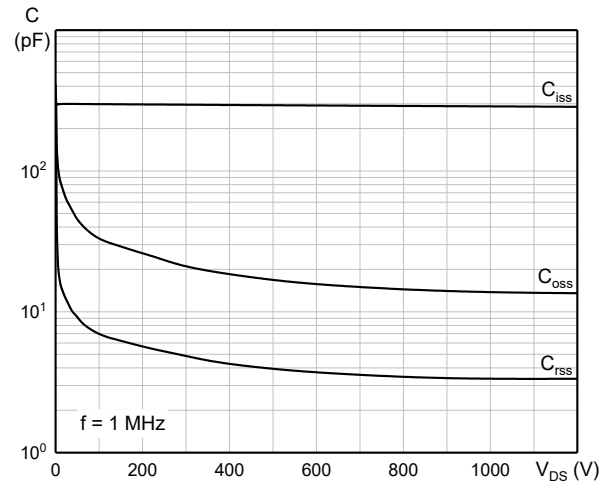


Figure 8. Typical Capacitance Characteristics

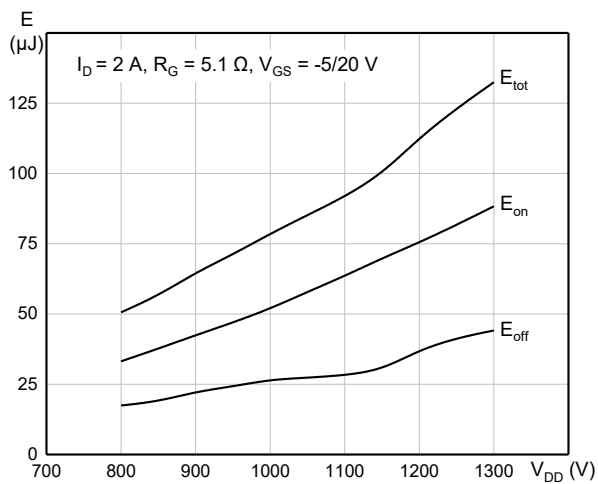


Figure 9. Typical Switching Energy vs. Supply Voltage

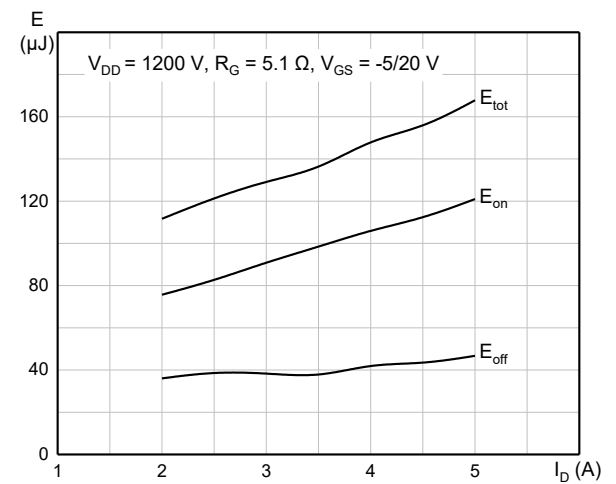


Figure 10. Typical Switching Energy vs. Drain Current

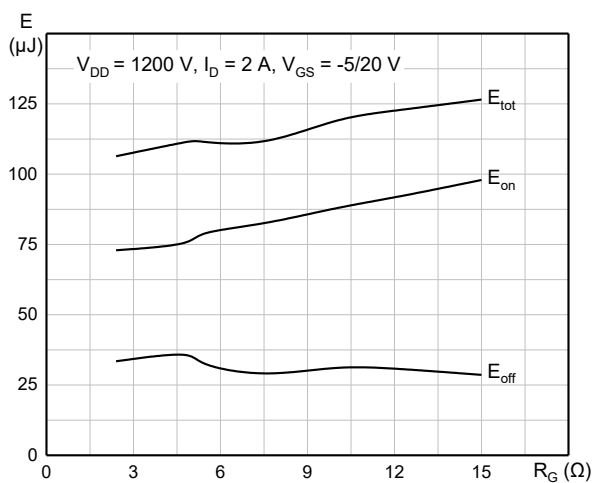


Figure 11. Typical Switching Energy vs. Gate Resistance

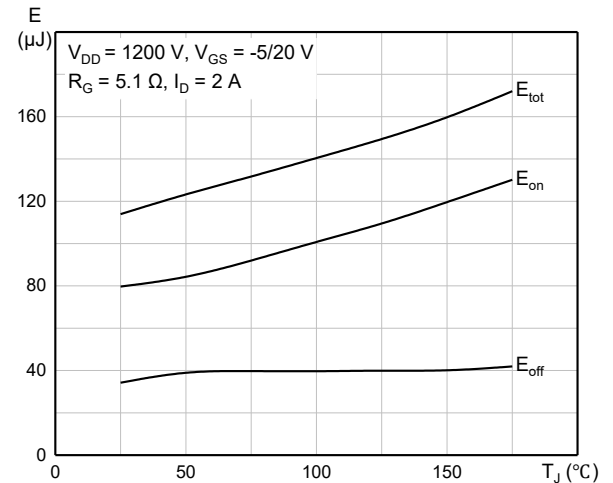


Figure 12. Typical Switching Energy vs. Temperature

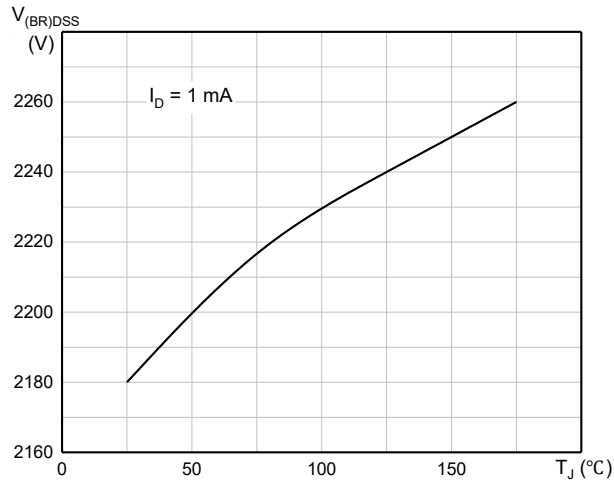


Figure 13. Breakdown Voltage vs. Temperature

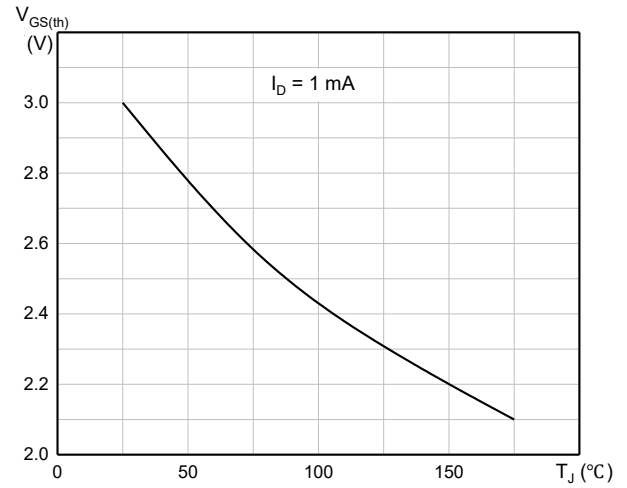


Figure 14. Gate Threshold vs. Temperature

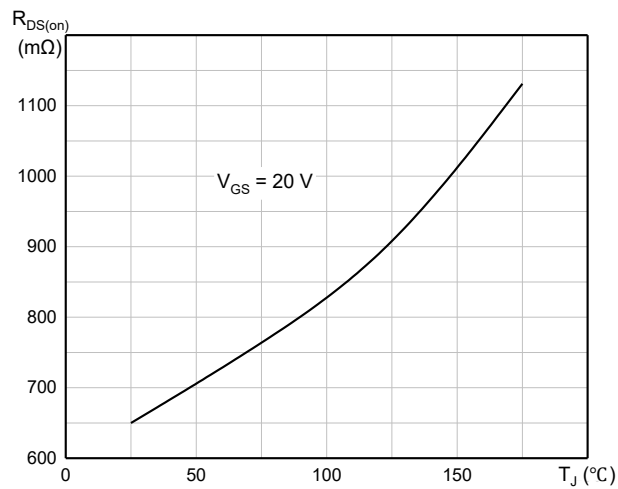
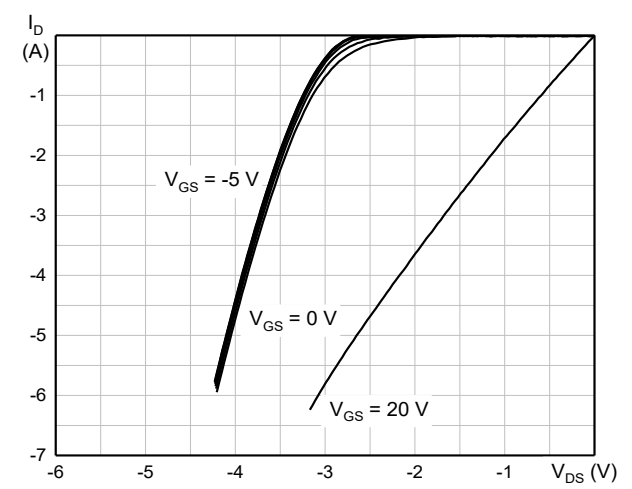
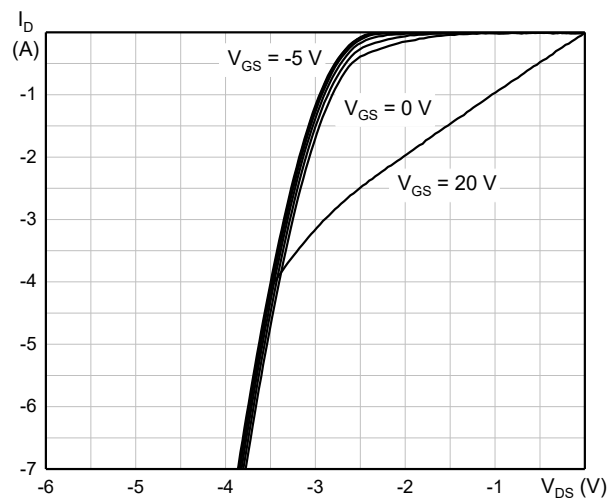
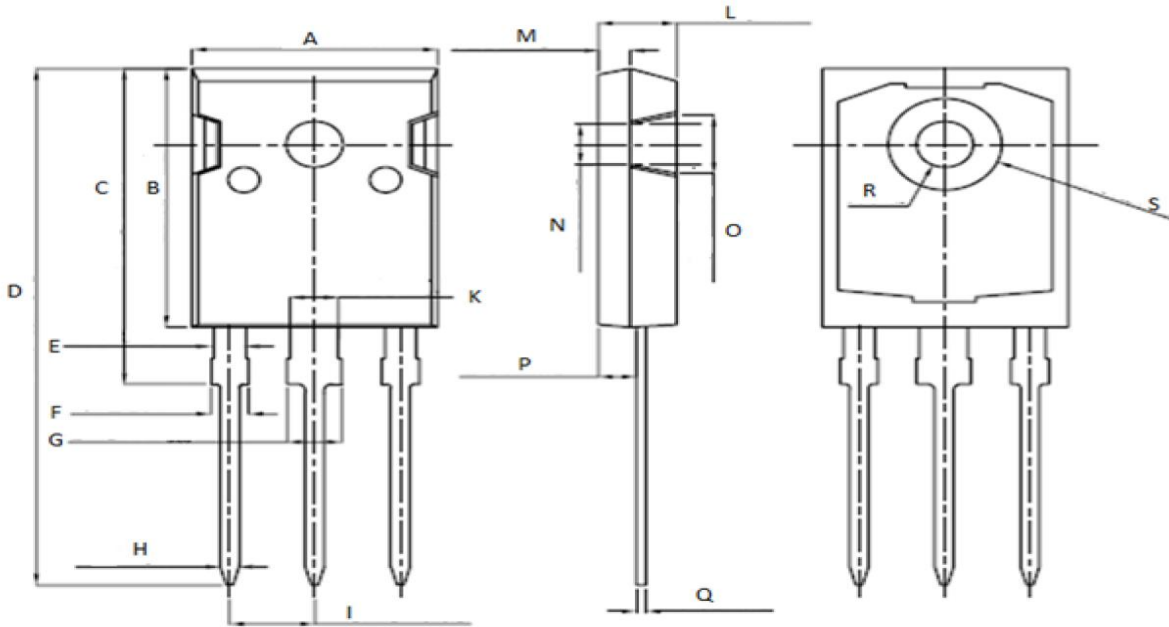


Figure 15. On-Resistance vs. Temperature


Figure 16. Body Diode Characteristics, $T_J = 25^\circ\text{C}$

Figure 17. Body Diode Characteristics, $T_J = 175^\circ\text{C}$

Package Information

Package TO-247-3



Unit: mm		
Symbol	Min.	Max.
A	15.95	16.25
B	20.85	21.25
C	20.95	21.35
D	40.5	40.9
E	1.9	2.1
F	2.1	2.25
G	3.1	3.25
H	1.1	1.3
I	5.40	5.50

Unit: mm		
Symbol	Min.	Max.
K	2.90	3.10
L	4.90	5.30
M	1.90	2.10
N	4.50	4.70
O	5.40	5.60
P	2.29	2.49
Q	0.51	0.71
R	φ 3.5	φ 3.7
S	φ 7.1	φ 7.3