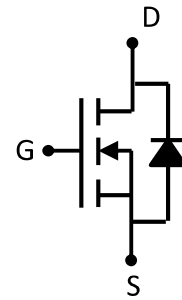


## Feature

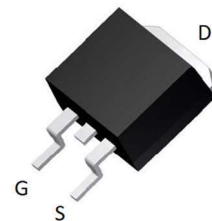
- 100V,120A  
 $R_{DS(ON)} < 4.2m\Omega @ V_{GS}=10V$  TYP:3.7m $\Omega$
- Low FOM  $R_{DS(ON)} \times Q_G$
- Ultra-low on-resistance
- Halogen-free
- RoHS compliant



Schematic diagram

## Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch
- Motor Drivers



TO-263 top view

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G040N10D	APG040N10D	TO-263		-	800

## ABSOLUTE MAXIMUM RATINGS ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_C=25^\circ\text{C}$ )	$I_D$	120	A
Continuous Drain Current ( $T_C=100^\circ\text{C}$ )	$I_D$	100	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	460	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	317	mJ
Power Dissipation	$P_D$	178	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.7	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	54	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>J</sub>=25°C unless otherwise noted)**

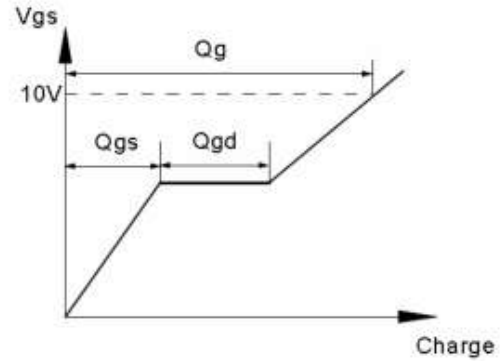
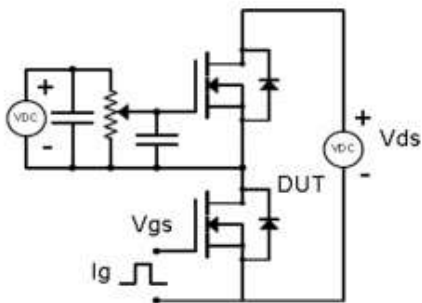
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	100	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	3.7	4.2	mΩ
Gate Resistance	R <sub>G</sub>	f=1MHZ	-	1.6	-	Ω
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f =1MHz	-	4270	-	pF
Output Capacitance	C <sub>oss</sub>		-	1280	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	63	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, R <sub>L</sub> =2.5Ω, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω	-	24	-	ns
Turn-on rise time	t <sub>r</sub>		-	35	-	
Turn-off delay time	t <sub>d(off)</sub>		-	53	-	
Turn-off fall time	t <sub>f</sub>		-	31	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	66	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	17	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	16	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	0.7	1.2	V
Maximum Continuous Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	120	A
Maximum Pulsed Diode Forward current <sup>(4)</sup>	I <sub>SM</sub>		-	-	460	A
Reverse recovery time	T <sub>rr</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	67	-	ns
Reverse recovery charge	Q <sub>rr</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	117	-	nC
Peak Reverse recovery Current	I <sub>RRM</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	3.1	-	A

**Notes:**

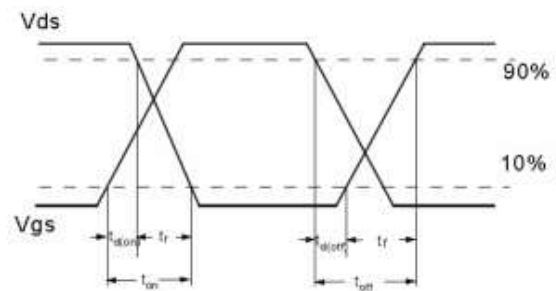
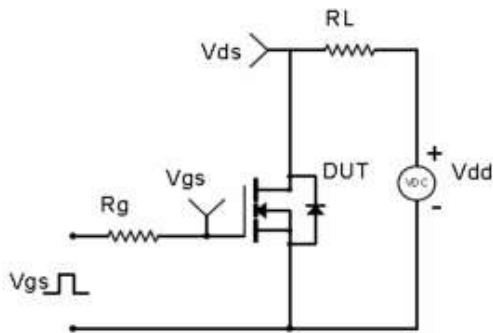
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, R<sub>G</sub>=25 Ω, L=0.5mH
3. Pulse Test: pulse width ≤300μs, duty cycle ≤2%
4. Surface Mounted on FR4 Board, t ≤10 sec

**Test Circuit & Waveform**

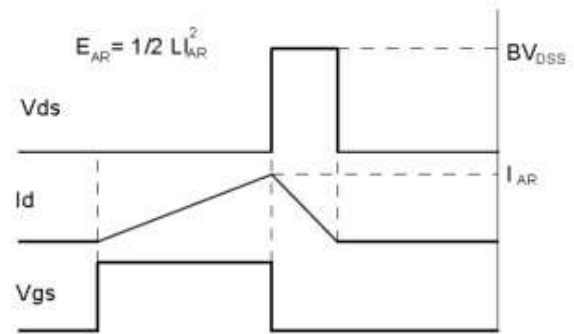
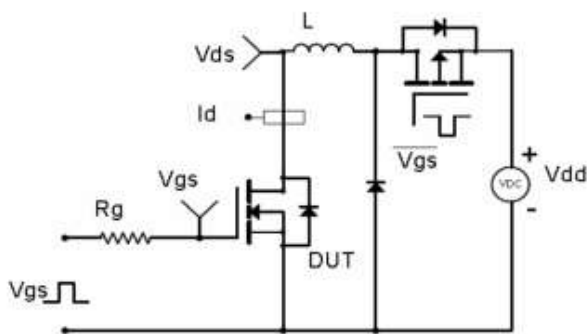
Gate Charge Test Circuit & Waveform



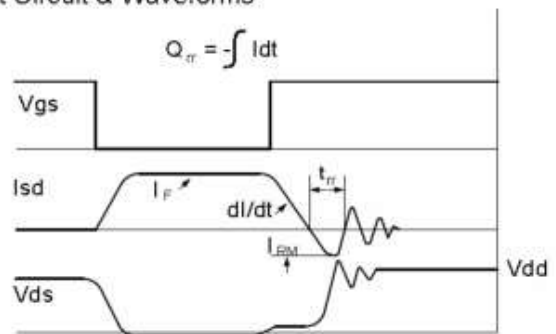
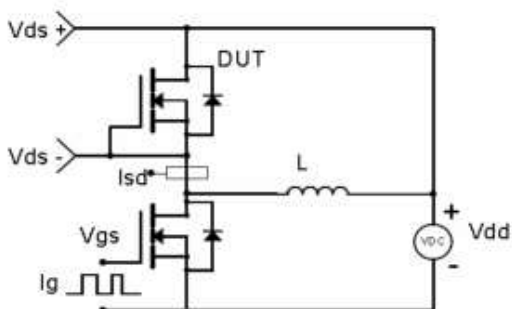
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Electrical Characteristics Diagrams**

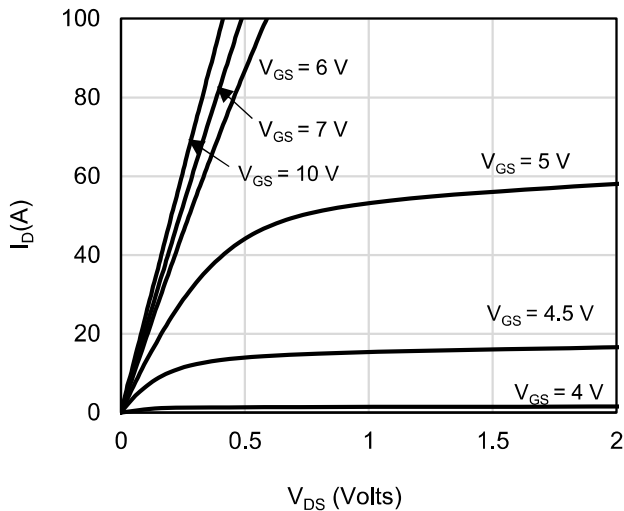


Figure 1: On-Region Characteristics

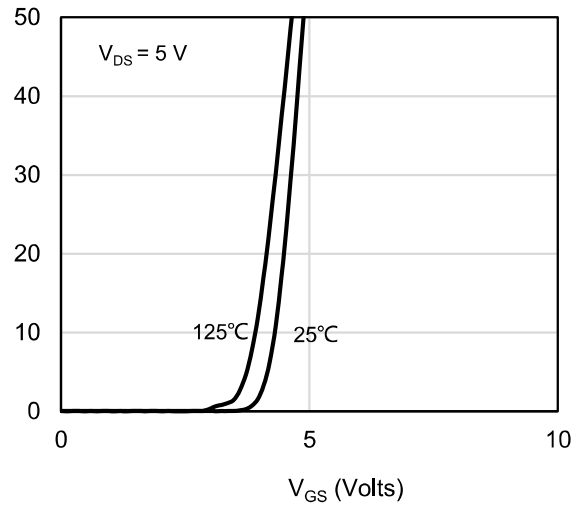


Figure 2: Transfer Characteristics

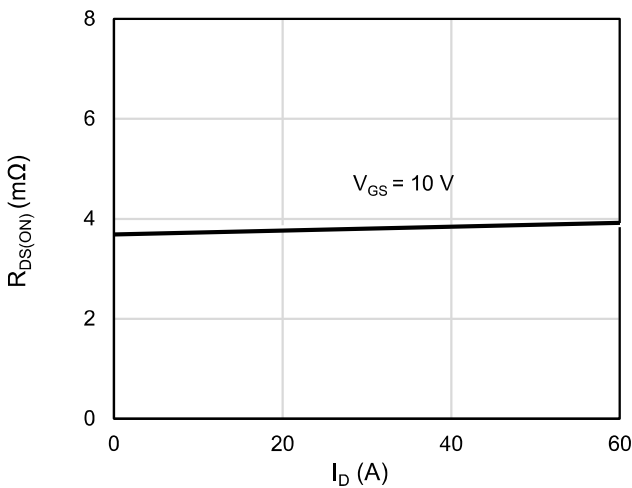


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

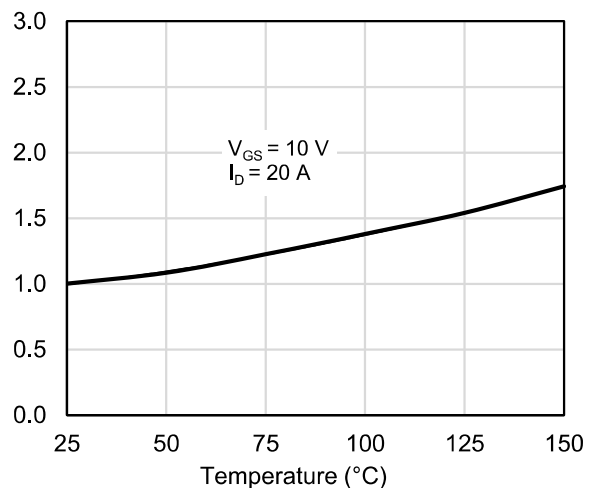


Figure 4: On-Resistance vs. Junction Temperature

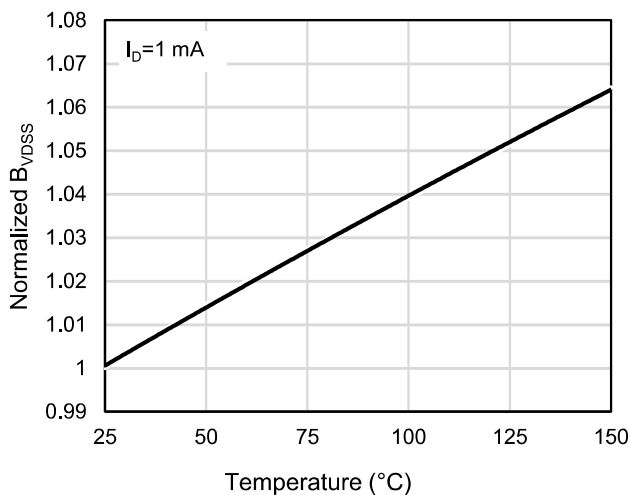


Figure 5: Breakdown Voltage vs. Junction Temperature

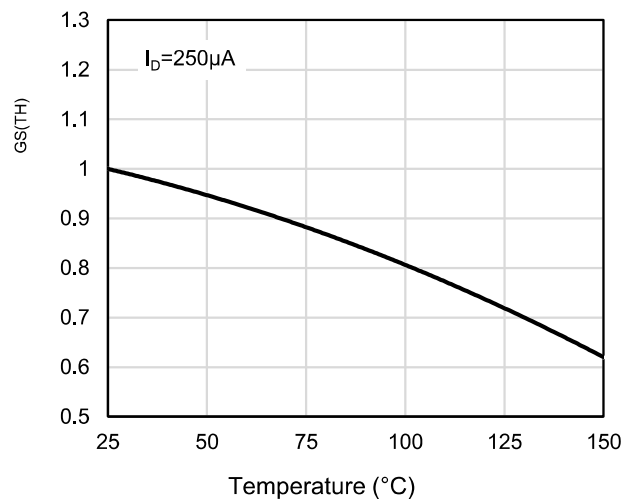


Figure 6: Threshold Voltage vs. Junction Temperature

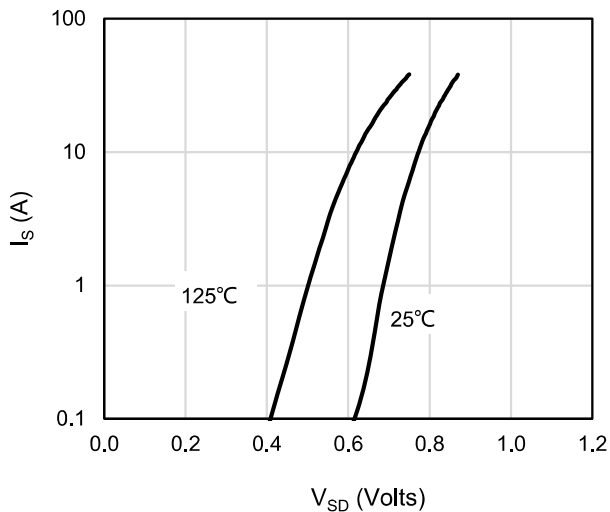


Figure 7: Body-Diode Characteristics

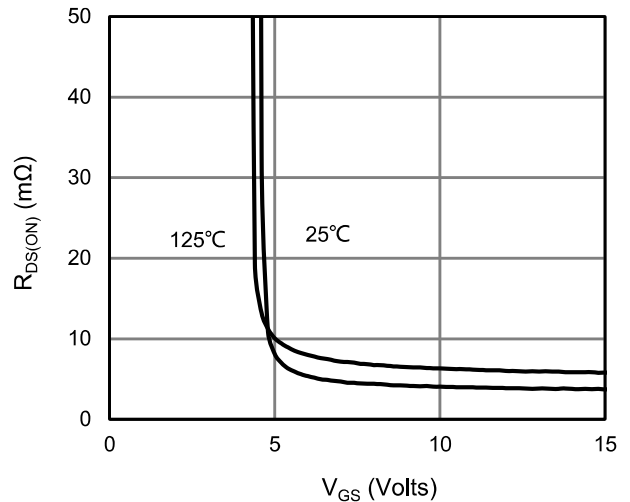


Figure 8: On-Resistance vs. Gate-Source Voltage

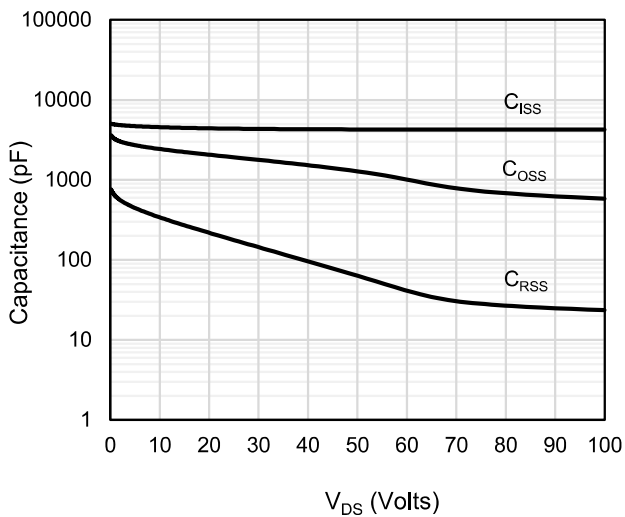


Figure 9: Capacitance Characteristics

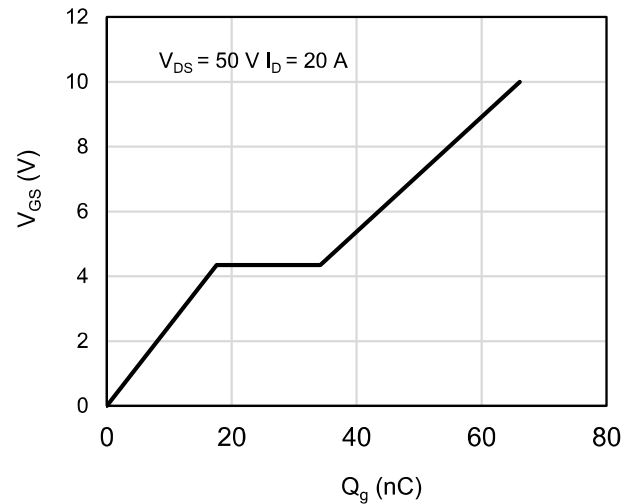


Figure 10: Gate-Charge Characteristics

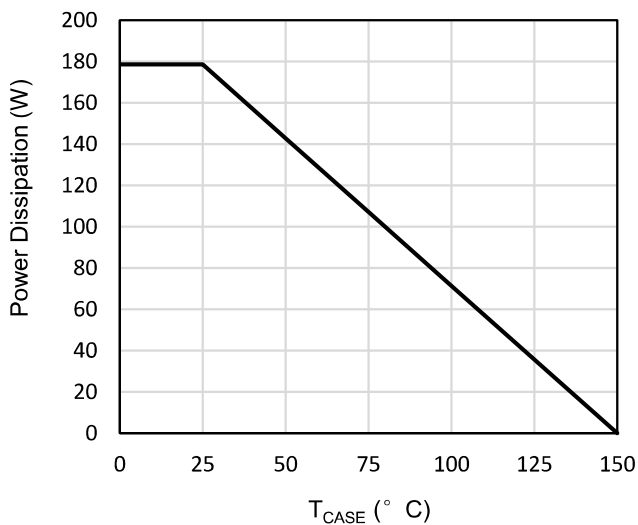


Figure 11: Power De-rating

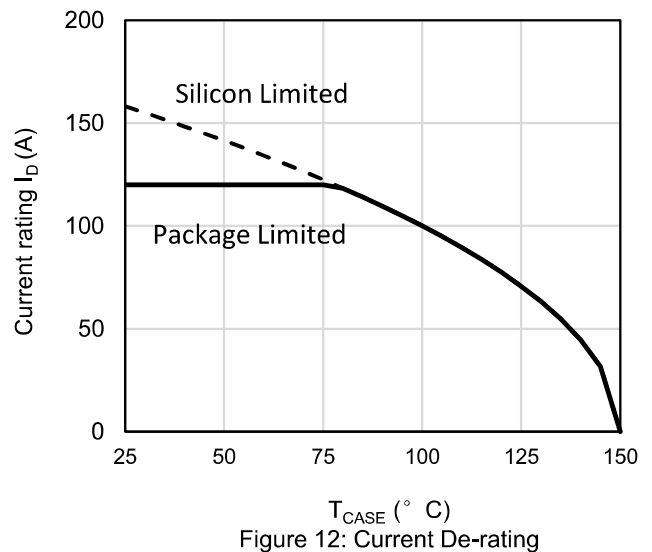


Figure 12: Current De-rating

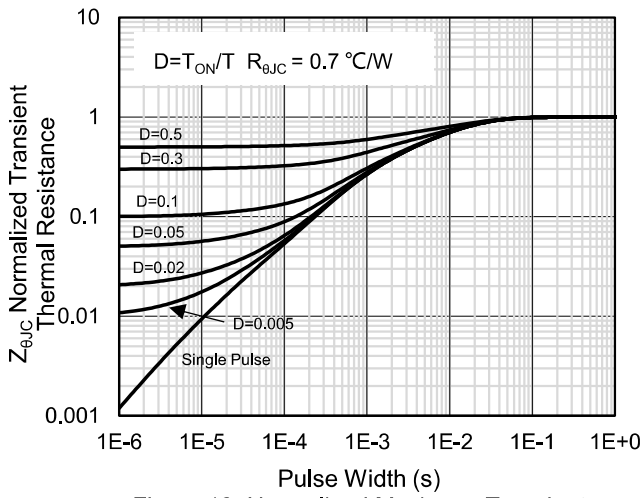


Figure 13: Normalized Maximum Transient Thermal Impedance

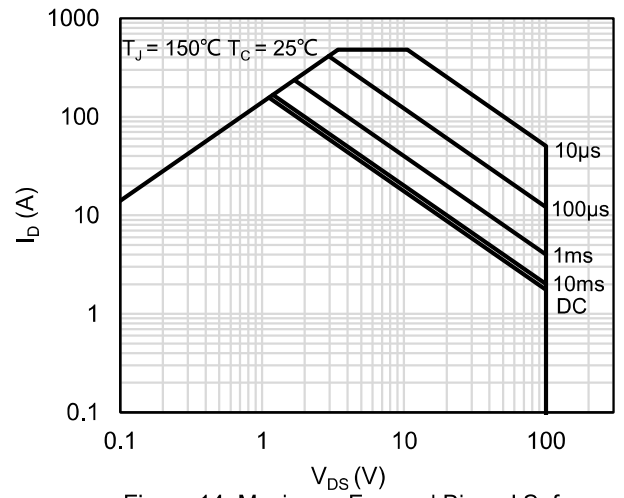
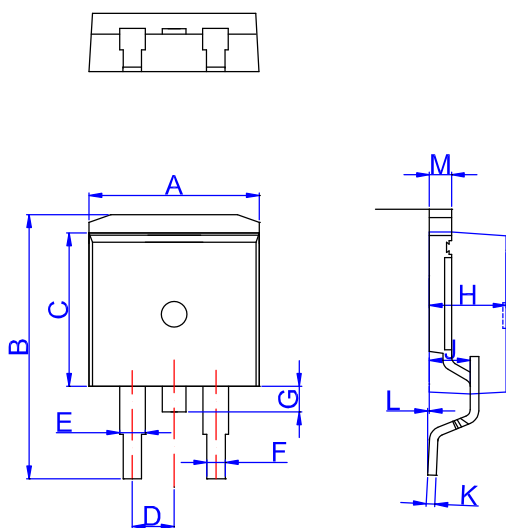


Figure 14: Maximum Forward Biased Safe Operating Area

**TO-263 Package Information**



TO-263

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053