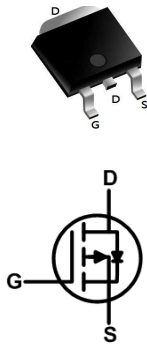


Features

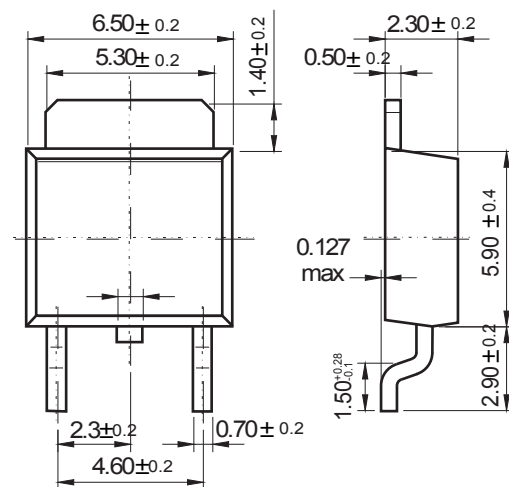
Excellent $R_{DS(ON)}$ and Low Gate Charge
 100% UIS Tested
 100% ΔV_{ds} Tested
 Halogen-free; RoHS-compliant

Applications

Load Switch
 PWM Application
 Power Management


TO-252

Unit: mm



Dimensions in inches and (millimeters)

Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	-40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	110	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	W
		$T_C = 100^\circ\text{C}$	
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽³⁾	54	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.2	

50P04

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = -250μA, V _{GS} = 0V	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -40V, V _{GS} = 0V	-	-	-1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1.1	-1.6	-2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = -10V, I _D = -20A	-	8.3	12.5	mΩ
		V _{GS} = -4.5V, I _D = -10A	-	10.2	14.0	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	9.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = -20V, f = 1MHz	-	3639	-	pF
C _{oss}	Output Capacitance		-	311	-	pF
C _{rss}	Reverse Transfer Capacitance		-	247	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to -10V V _{DS} = -20V, I _D = -10A	49	69	93	nC
Q _{gs}	Gate Source Charge		-	10.6	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	11	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = -10V, V _{DD} = -20V I _D = -10A, R _{GEN} = 2.7Ω	-	6.7	-	ns
t _r	Turn-On Rise Time		-	6.1	-	ns
t _{d(off)}	Turn-Off DelayTime		-	102	-	ns
t _f	Turn-Off Fall Time		-	117	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	-69	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	-276	A
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _S = -20A	-		-1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F = -10A, di/dt = 100A/us	13	19	25	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	11	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting T_J=25C, V_{DD}=-20V, V_{GS}=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-21A, V_{DD}=0V during time in avalanche.
 3. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

RATING AND CHARACTERISTIC CURVES (50P04)

Figure 1: Power De-rating

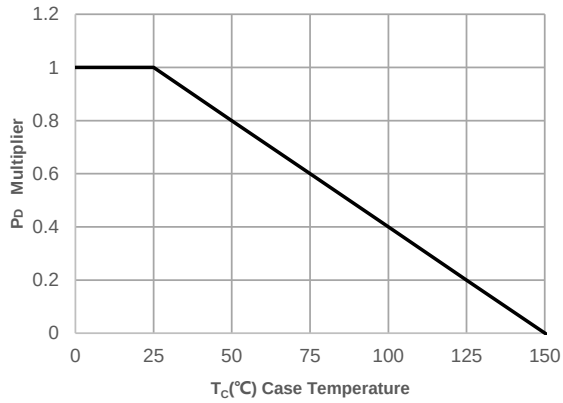


Figure 2: Current De-rating

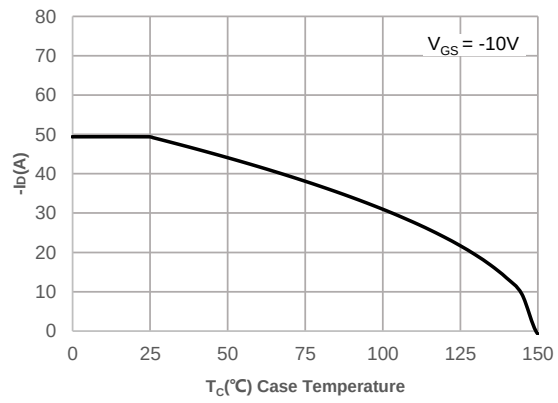


Figure 3: Normalized Maximum Transient Thermal Impedance

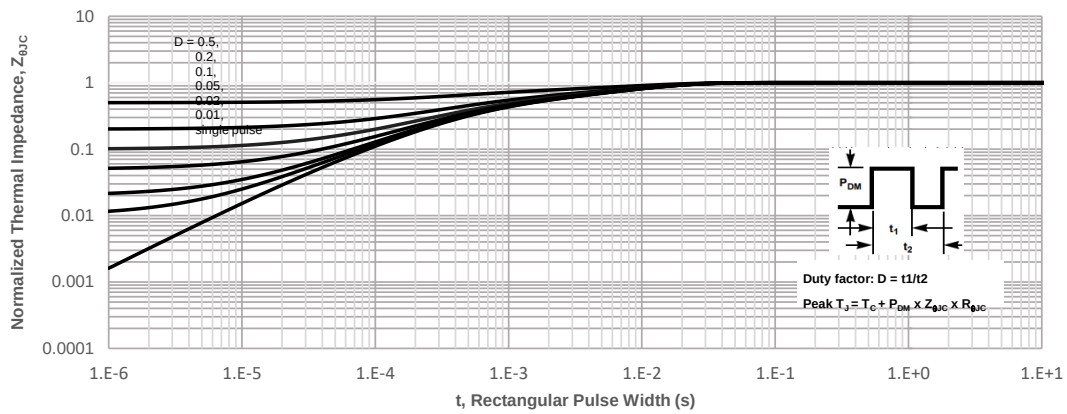
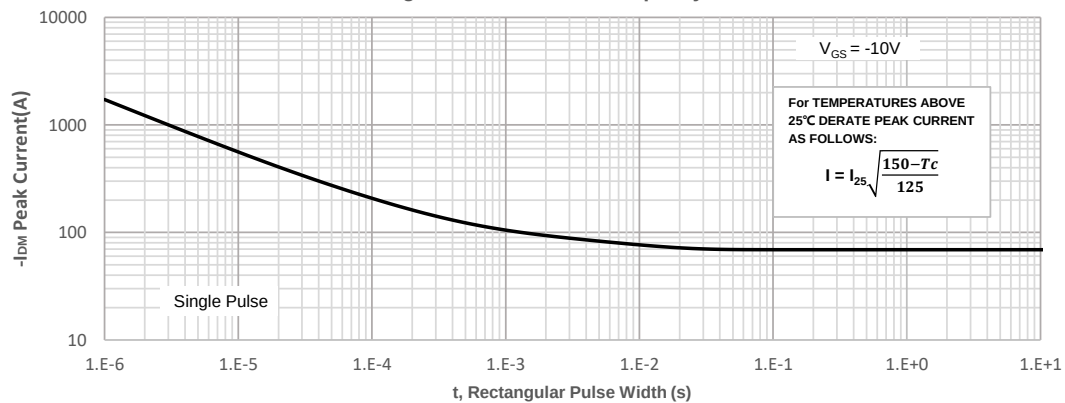


Figure 4: Peak Current Capacity



RATING AND CHARACTERISTIC CURVES (50P04)

Figure 5: Output Characteristics

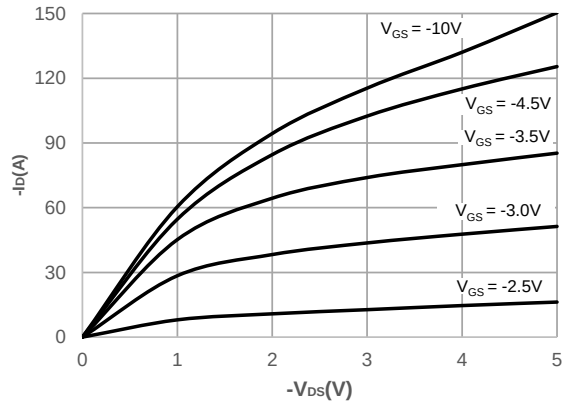


Figure 6: Typical Transfer Characteristics

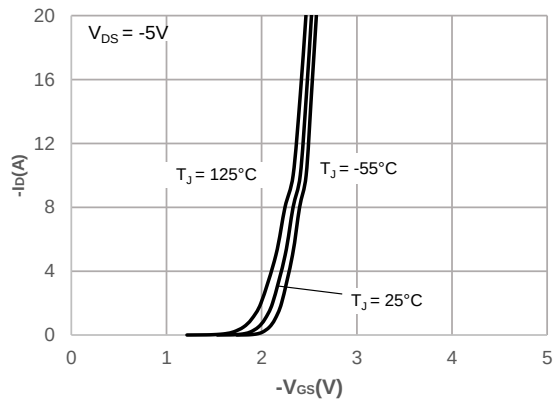


Figure 7: On-resistance vs. Drain Current

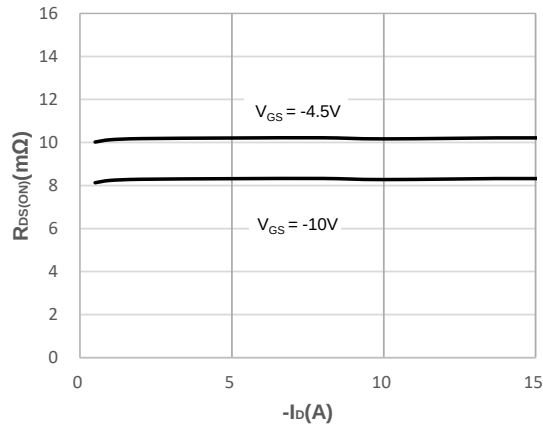


Figure 8: Body Diode Characteristics

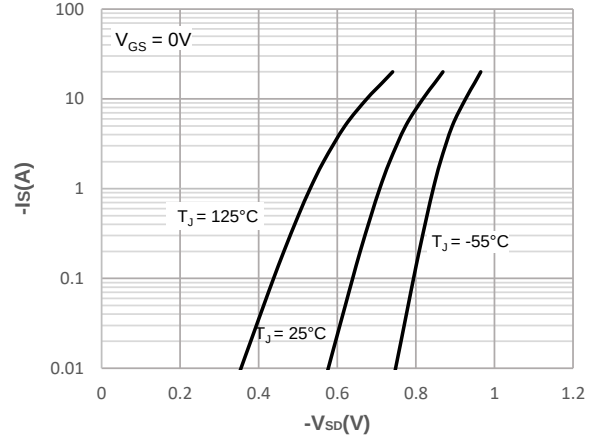


Figure 9: Gate Charge Characteristics

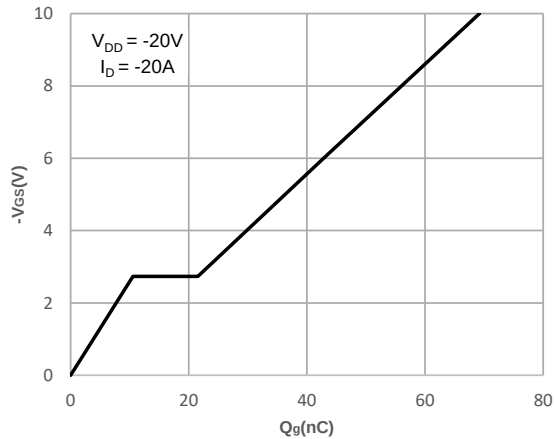
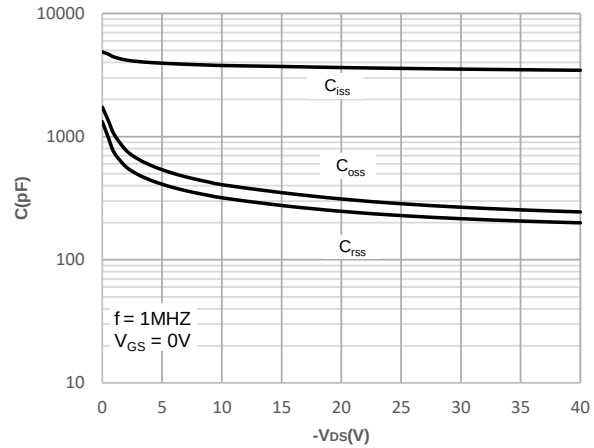


Figure 10: Capacitance Characteristics



RATING AND CHARACTERISTIC CURVES (50P04)

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

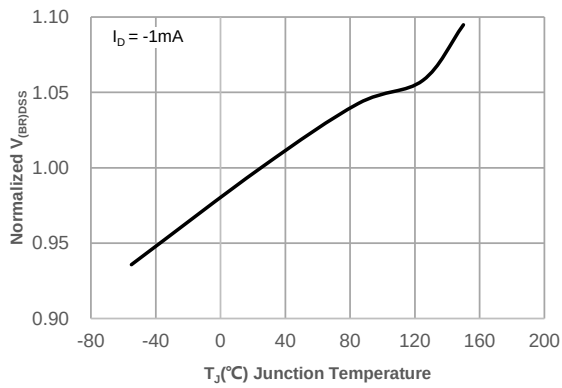


Figure 12: Normalized on Resistance vs. Junction Temperature

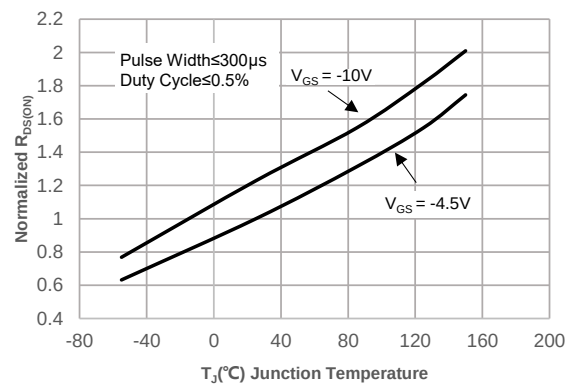


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

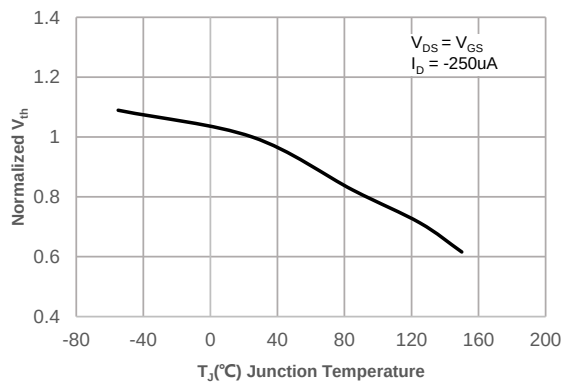


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

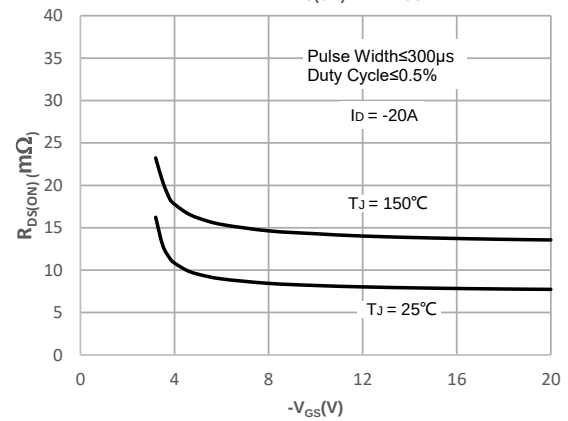


Figure 15: Maximum Safe Operating Area

