

## P-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
- 100	0.195 at V <sub>GS</sub> = - 10 V	- 19	11.7
	0.210 at V <sub>GS</sub> = - 4.5 V	- 17	

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

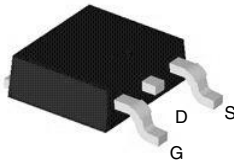


**RoHS**  
COMPLIANT

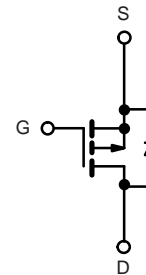
### APPLICATIONS

- Power Switch
- DC/DC Converters

### TO-252 Pin Configuration



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T <sub>C</sub> = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 100	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	- 19	A
		T <sub>C</sub> = 70 °C	- 12.1	
Pulsed Drain Current	I <sub>DM</sub>	- 57		
Avalanche Current	I <sub>AS</sub>	- 18		
Single Avalanche Energy <sup>a</sup>	L = 0.1 mH	E <sub>AS</sub>	16.2	mJ
Maximum Power Dissipation <sup>a</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	32.1 <sup>b</sup>	W
	T <sub>A</sub> = 25 °C <sup>c</sup>		2.5	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Limit	Unit	
Junction-to-Ambient (PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	50	°C/W	
Junction-to-Case (Drain)	R <sub>thJC</sub>	3.9		

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. When Mounted on 1" square PCB (FR-4 material).

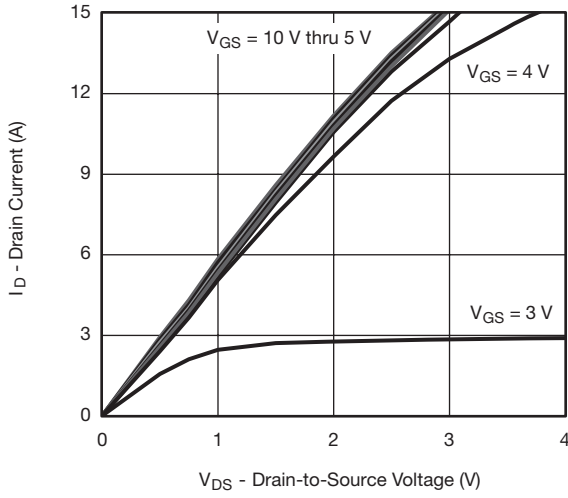
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{DS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-2.5	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 250$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-250	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -10\text{ V}, V_{GS} = -10\text{ V}$	-15			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3.6\text{ A}$		0.162	0.195	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -3.4\text{ A}$		0.175	0.210	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -3.6\text{ A}$		12		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = -50\text{ V}, f = 1\text{ MHz}$		1055		$\mu\text{F}$
Output Capacitance	$C_{oss}$			65		
Reverse Transfer Capacitance	$C_{rss}$			41		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = -50\text{ V}, V_{GS} = -10\text{ V}, I_D = -3.6\text{ A}$		23.2	34.8	nC
		$V_{DS} = -50\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -3.6\text{ A}$		11.7	17.6	
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			3.5		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			4.8		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$	1.2	5.7	11.5	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -50\text{ V}, R_L = 17.2\text{ }\Omega$ $I_D \cong -2.9\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		7	14	ns
Rise Time <sup>c</sup>	$t_r$			12	18	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			33	50	
Fall Time <sup>c</sup>	$t_f$			9	18	
<b>Drain-Source Body Diode Ratings and Characteristics</b> $T_C = 25\text{ }^\circ\text{C}^b$						
Continuous Current	$I_S$				-19	A
Pulsed Current	$I_{SM}$				-57	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = -2.9\text{ A}, V_{GS} = 0\text{ V}$		-0.8	-1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = -2.9\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50	75	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			-4	-6	A
Reverse Recovery Charge	$Q_{rr}$				98	147

Notes:

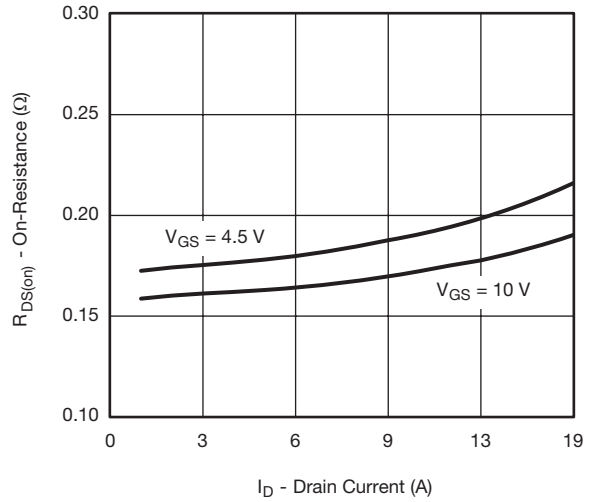
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

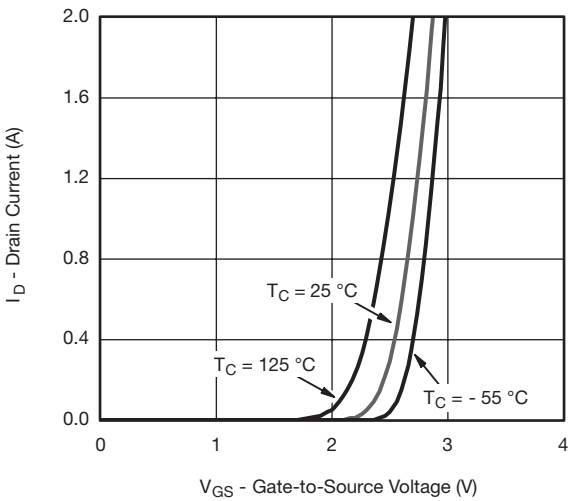
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



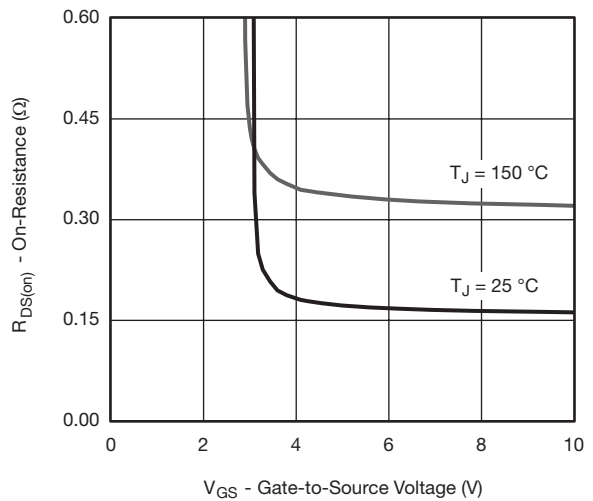
**Output Characteristics**



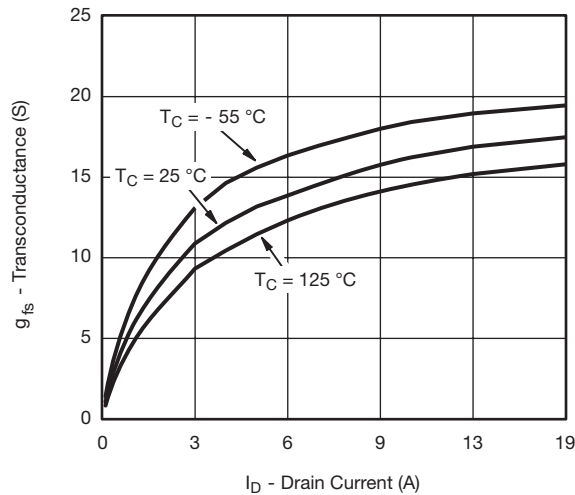
**On-Resistance vs. Drain Current**



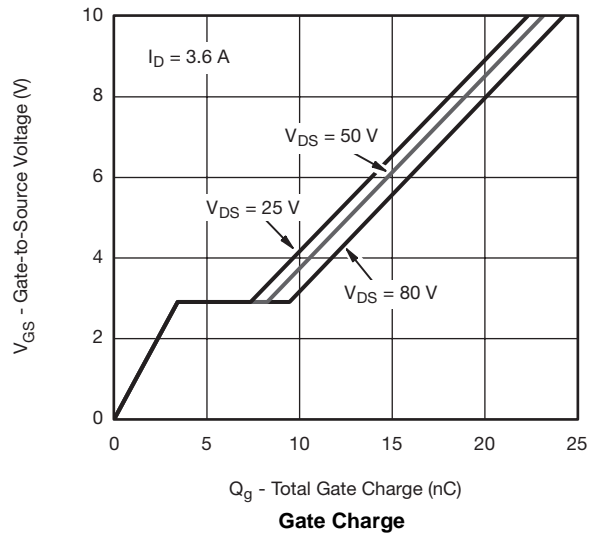
**Transfer Characteristics**



**On-Resistance vs. Gate-to-Source Voltage**

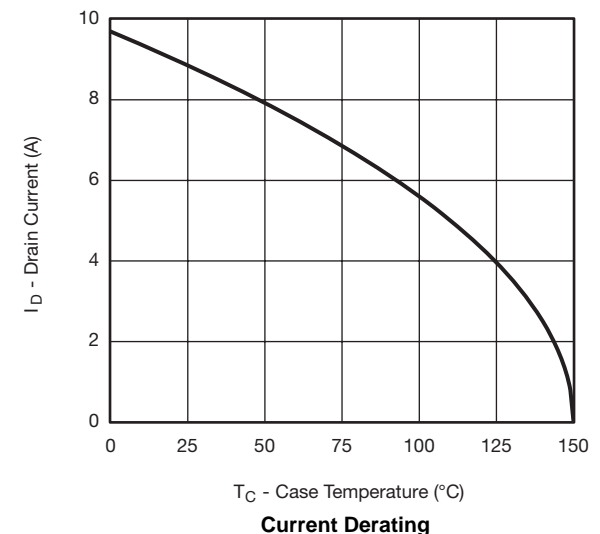
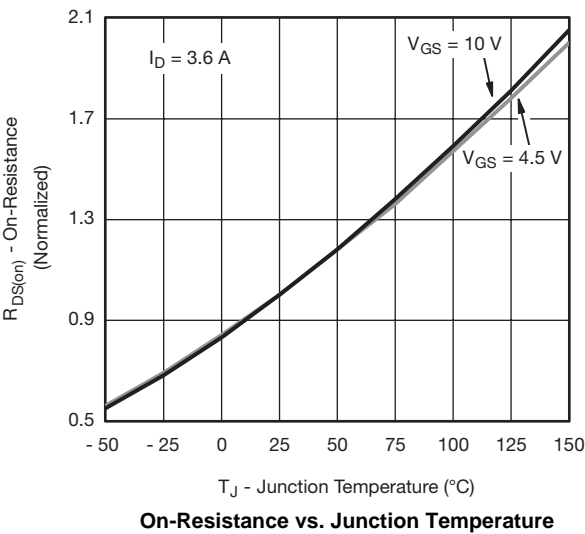
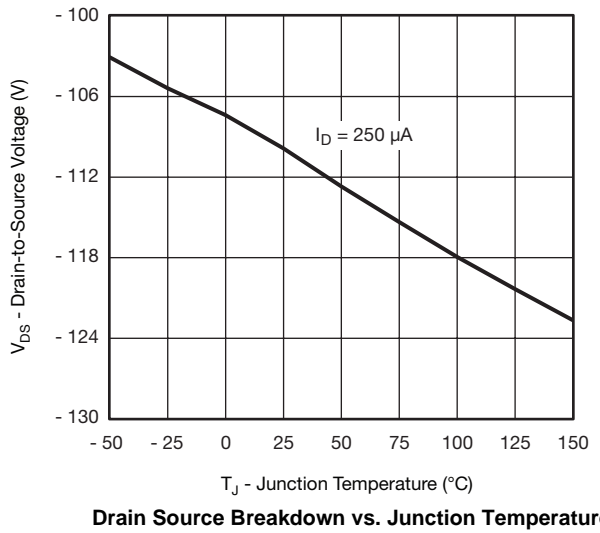
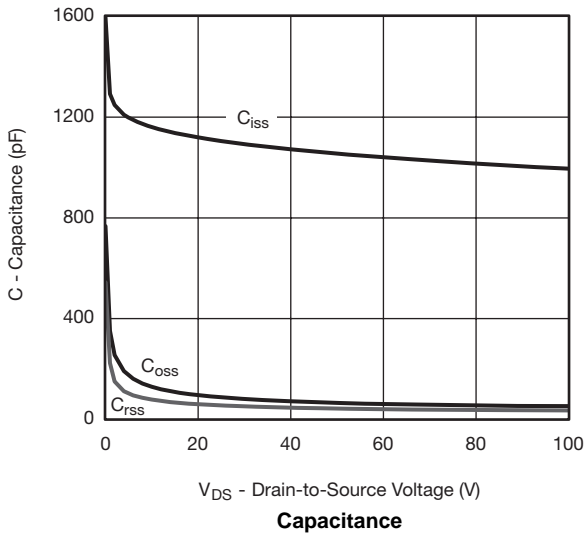
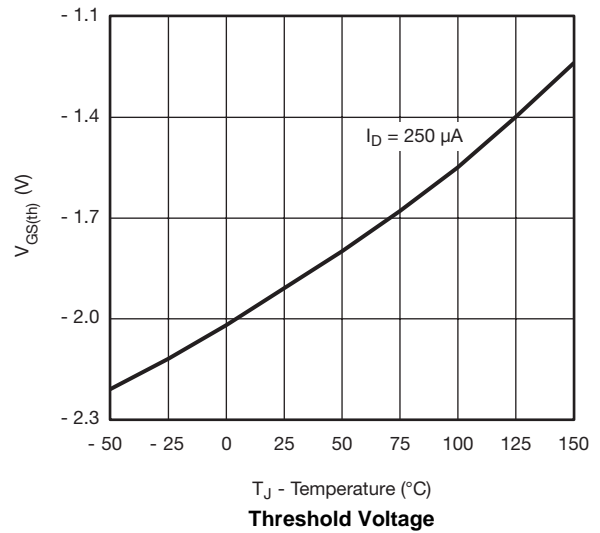
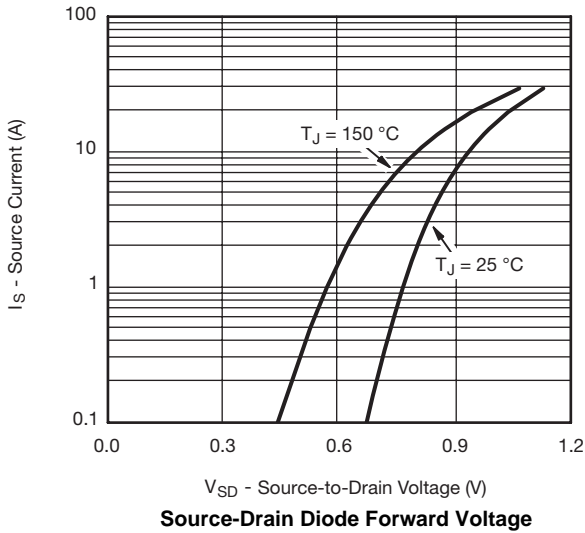


**Transconductance**

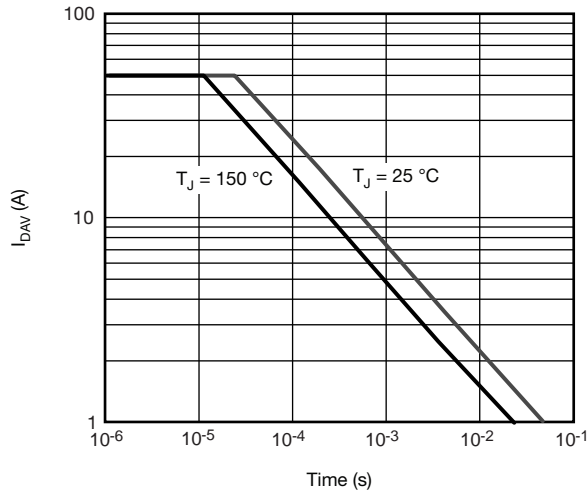


**Gate Charge**

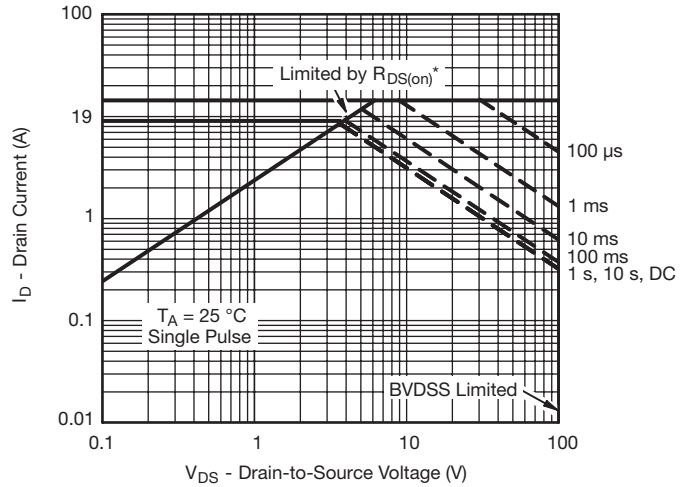
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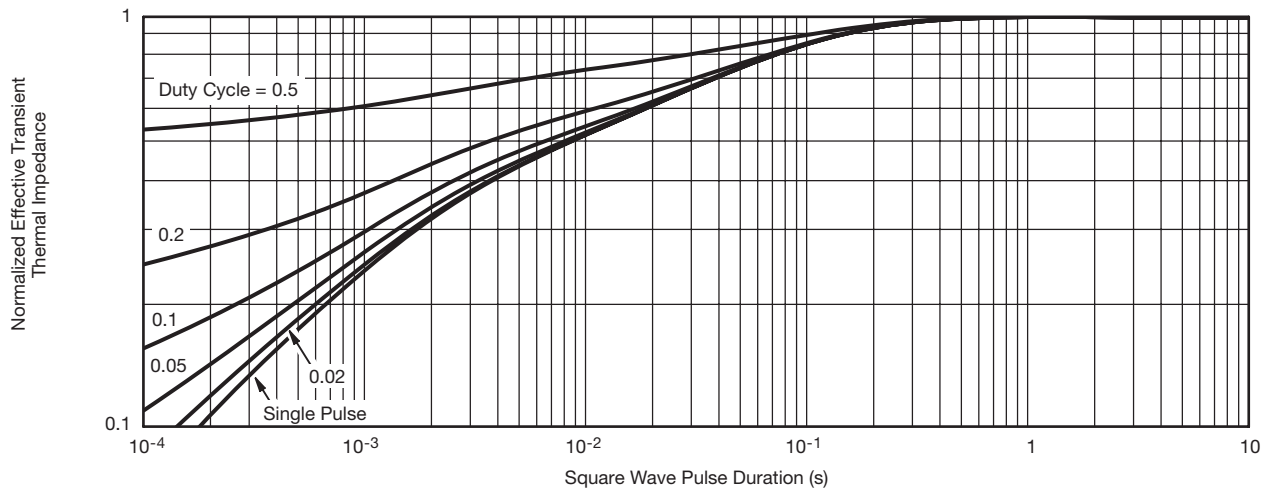


**Single Pulse Avalanche Current Capability vs. Time**



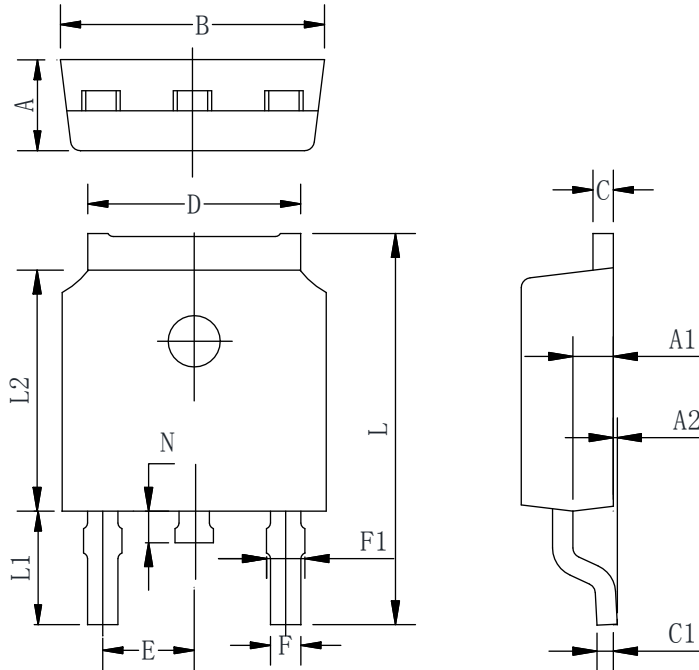
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Case**

## TO-252-2L PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	2.10	2.30	2.50
A1	0.88	1.01	1.16
A2	0.00	0.15	0.28
B	6.40	6.60	6.80
C	0.42	0.50	0.63
C1	0.42	0.50	0.63
D	5.08	5.32	5.65
E	2.286 TYP		
F	0.63	0.76	0.89
F1	0.64	0.86	1.08
L	9.30	9.90	10.80
L1	2.4	2.8	3.6
L2	5.90	6.10	6.55
N	0.57	0.80	1.05

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