

P-Channel 100 V (D-S) MOSFET



RoHS
COMPLIANT

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 100	0.043 at V _{GS} = - 10 V	- 40	35
	0.050 at V _{GS} = - 4.5 V	- 30	

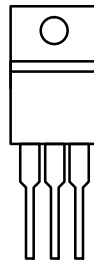
FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

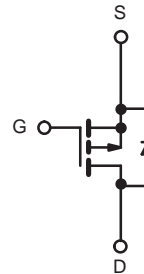
APPLICATIONS

- Power Switch
- DC/DC Converters
- Portable equipment and battery powered systems

TO-220AB



G D S
Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _C = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	- 100	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	- 40	A
		T _C = 70 °C	- 35	
Pulsed Drain Current	I _{DM}	- 160		
Avalanche Current	I _{AS}	- 36		
Single Avalanche Energy ^a	E _{AS}	39	mJ	
Maximum Power Dissipation ^a	P _D	T _C = 25 °C	120 ^b	W
		T _A = 25 °C ^c	3.8	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) ^c	R _{thJA}	50	°C/W
Junction-to-Case (Drain)	R _{thJC}	2.2	

Notes:

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When Mounted on 1" square PCB (FR-4 material).

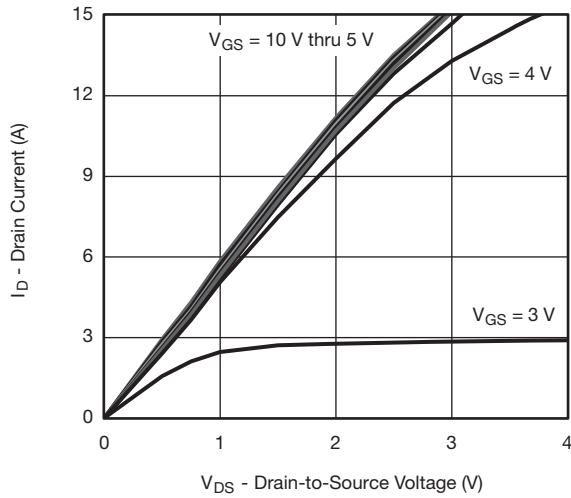
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -10\text{ V}, V_{GS} = -10\text{ V}$	-160			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		0.043	0.051	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$		0.050	0.065	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$		17		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -50\text{ V}, f = 1\text{ MHz}$		8510		μF
Output Capacitance	C_{oss}			1405		
Reverse Transfer Capacitance	C_{rss}			504		
Total Gate Charge ^c	Q_g	$V_{DS} = -50\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		35		nC
		$V_{DS} = -50\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$		15		
Gate-Source Charge ^c	Q_{gs}			8		
Gate-Drain Charge ^c	Q_{gd}			6		
Gate Resistance	R_g	$f = 1\text{ MHz}$	1.2	5.7	11.5	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -50\text{ V}, R_L = 17.2\text{ }\Omega$ $I_D \cong -2.9\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		18		ns
Rise Time ^c	t_r			22		
Turn-Off Delay Time ^c	$t_{d(off)}$			49		
Fall Time ^c	t_f			13.5		
Drain-Source Body Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$ ^b						
Continuous Current	I_S				-40	A
Pulsed Current	I_{SM}				-160	
Forward Voltage ^a	V_{SD}	$I_F = -2.9\text{ A}, V_{GS} = 0\text{ V}$		-0.7	-1.5	V
Reverse Recovery Time	t_{rr}	$I_F = -2.9\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50		ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			-4	-6	A
Reverse Recovery Charge	Q_{rr}			98	147	nC

Notes:

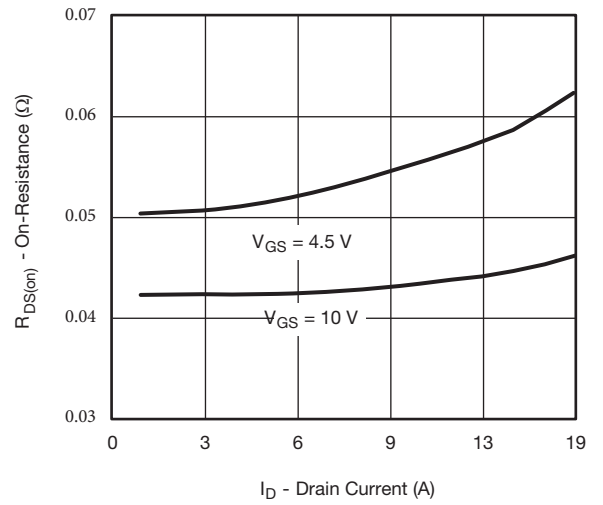
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

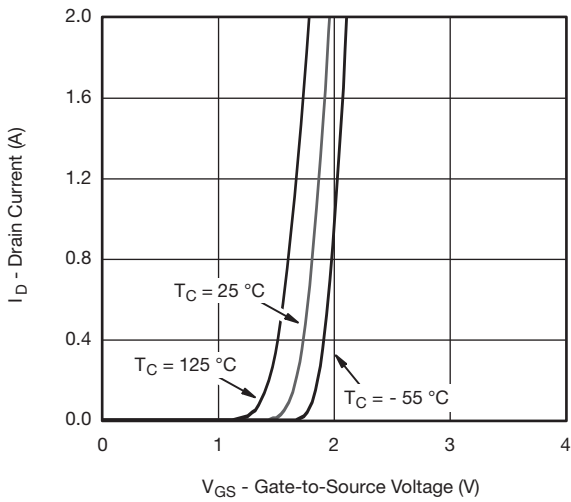
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



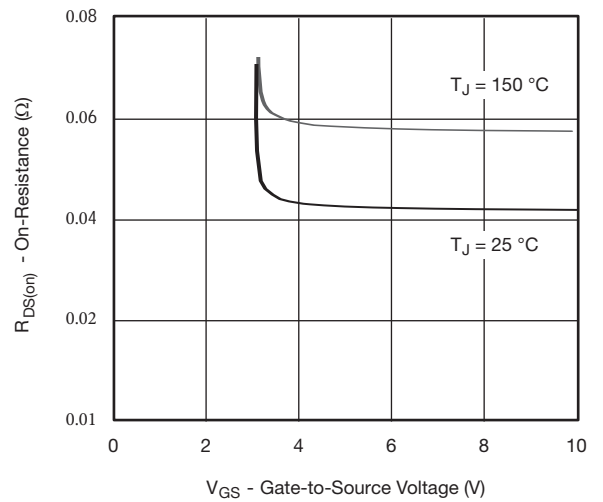
Output Characteristics



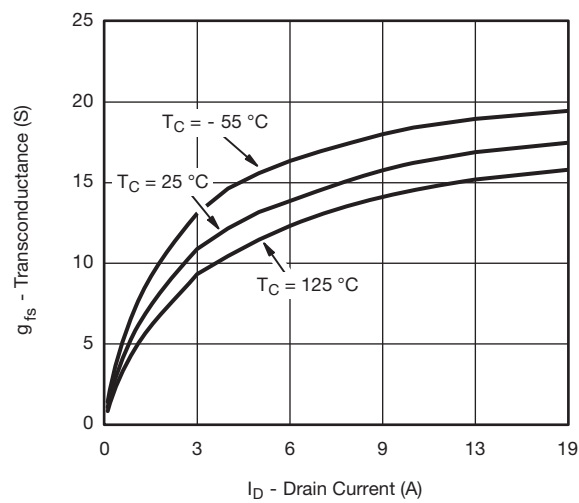
On-Resistance vs. Drain Current



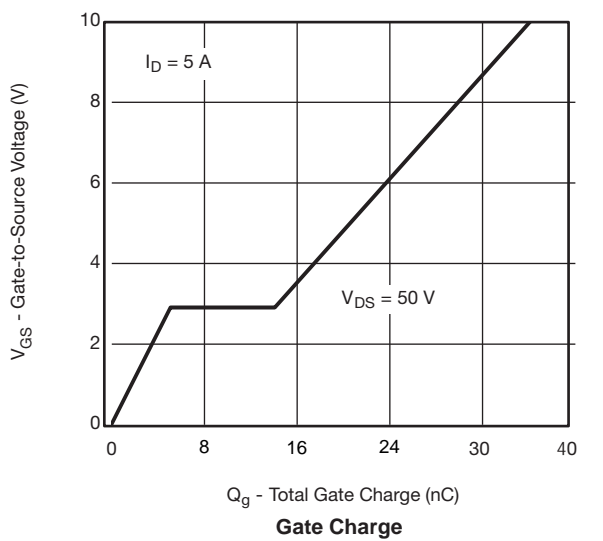
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage

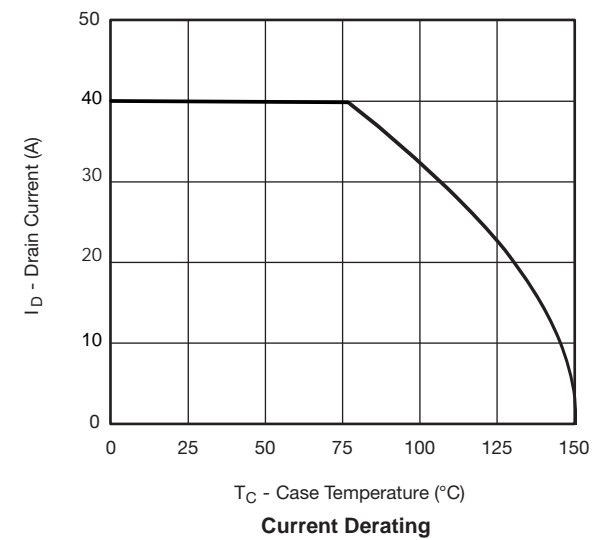
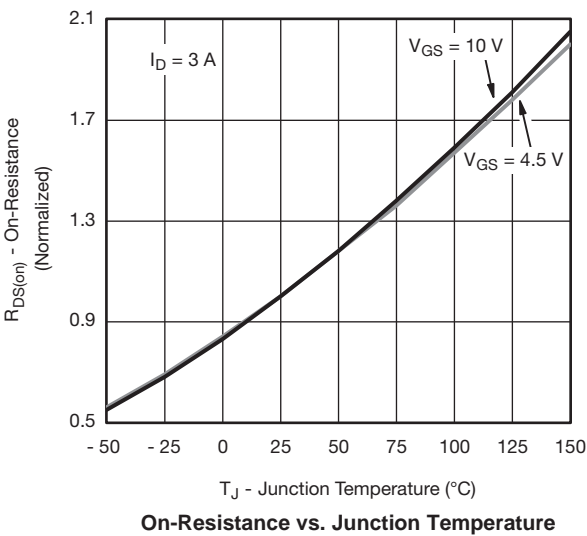
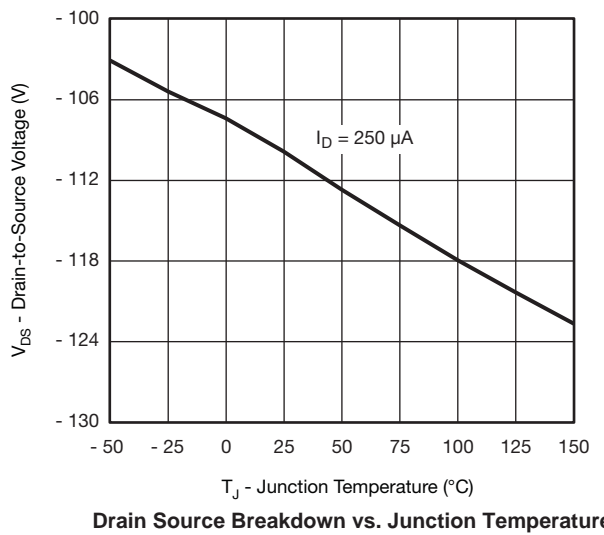
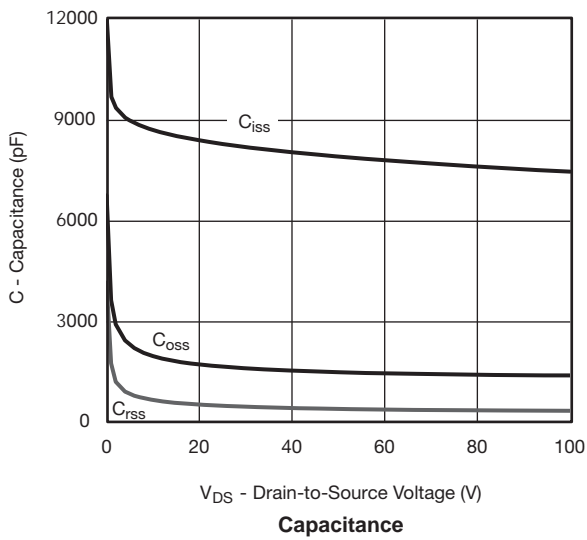
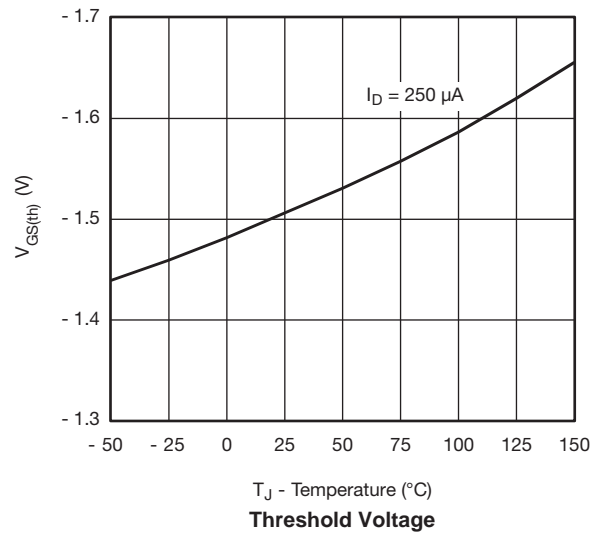
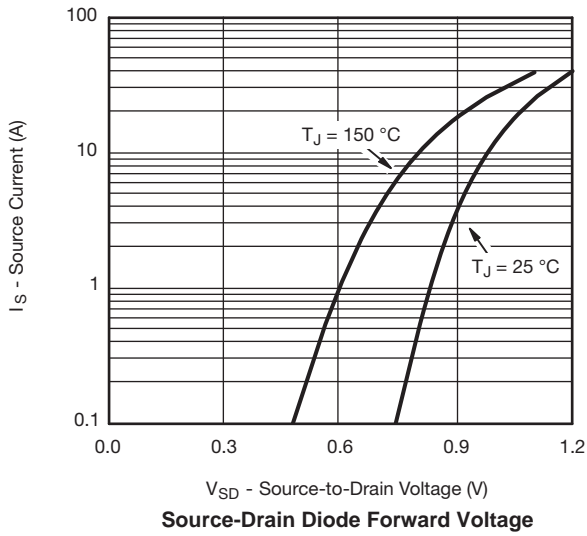


Transconductance

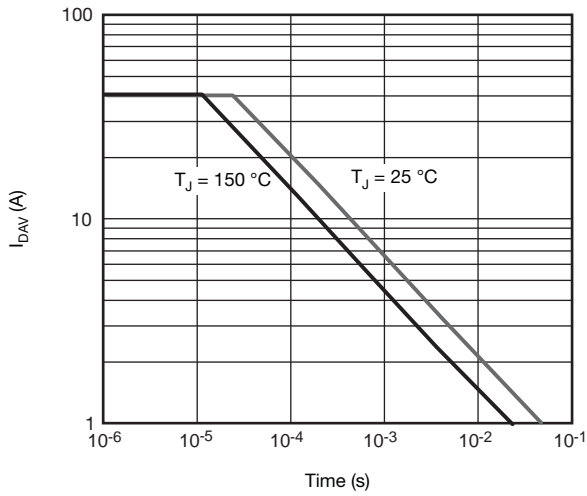


Gate Charge

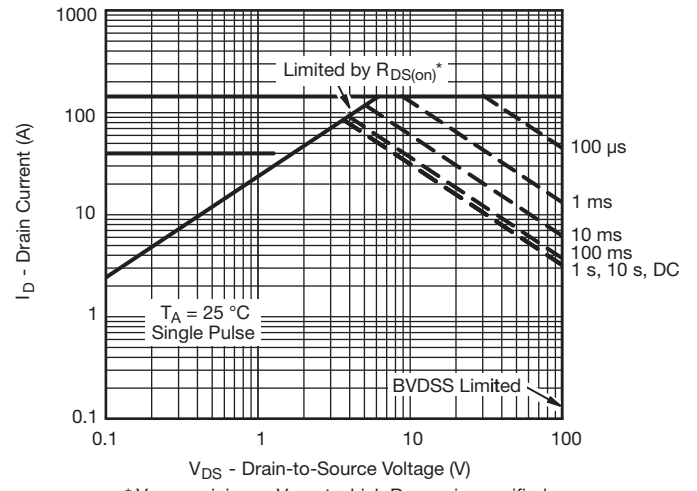
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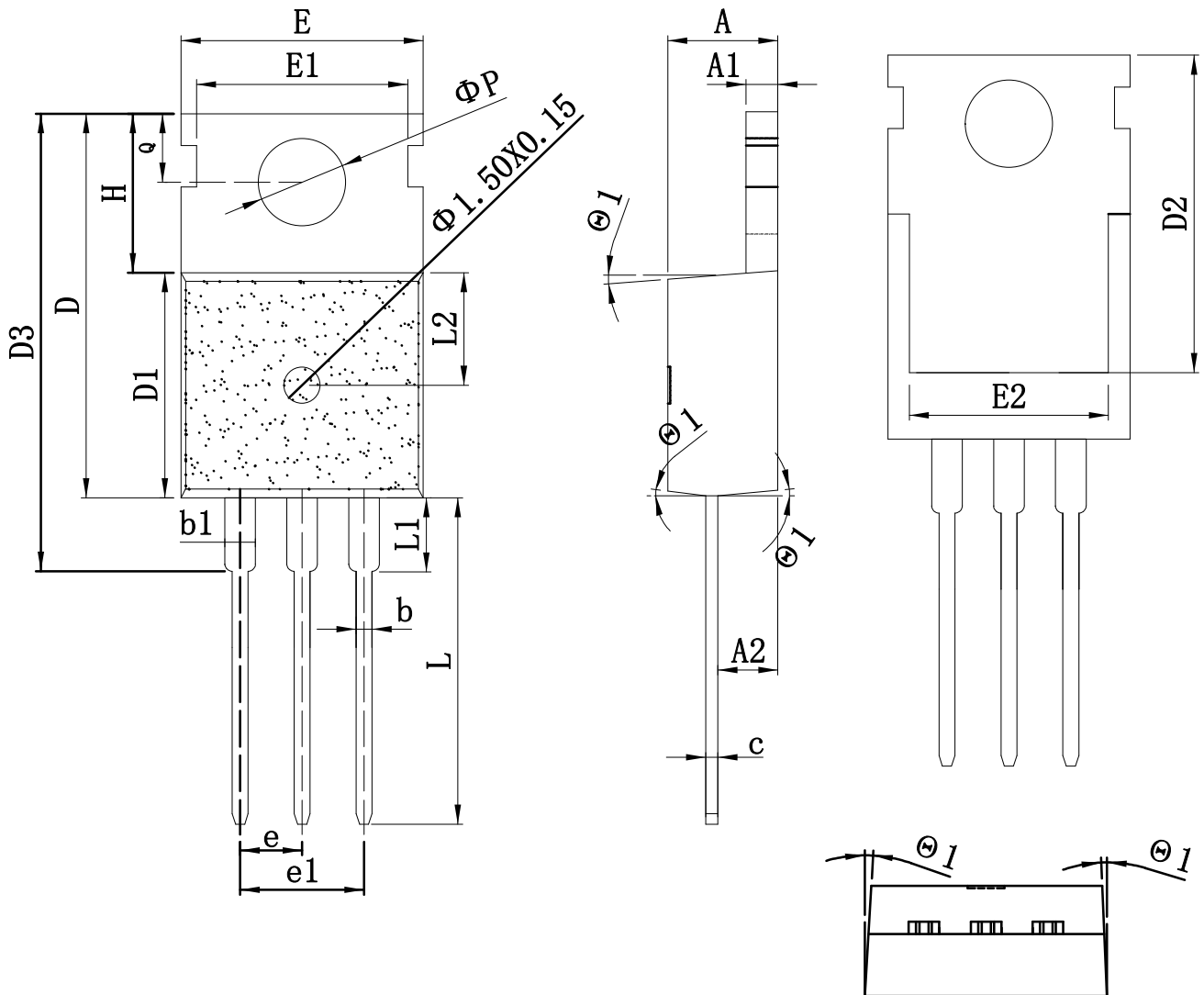


Single Pulse Avalanche Current Capability vs. Time



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

TO-220_3L PACKAGE OUTLINE



SYMBOL	mm			SYMBOL	mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	4.40	4.50	4.60	E1	8.55	8.70	8.85
A1	1.25	1.30	1.35	E2	7.80	8.00	8.20
A2	2.30	2.40	2.50	e	2.50	2.54	2.58
b	0.75	0.80	0.85	e1	5.08REF		
b1	1.25	1.33	1.42	H	6.40	6.50	6.60
c	0.45	0.50	0.55	L	13.00	13.28	13.45
D	15.65	15.75	15.85	L1	-	-	3.40
D1	9.10	9.20	9.30	L2	4.56	4.65	4.75
D2	12.90	13.10	13.30	ΦP	3.60	3.65	3.75
D3	15.45	15.80	16.15	Q	2.70	2.80	2.90
E	9.80	10.02	10.15	θ	2°	-	7°

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