

N-Channel 150 V (D-S) MOSFET



RoHS
COMPLIANT

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)(TYP.)	I_D (A)	Q_g (TYP.)
150	4.9 at $V_{GS} = 10$ V	180	98 nC

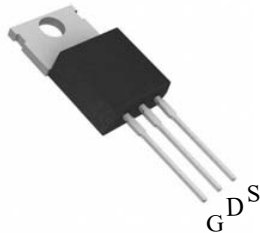
FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS tested
- High Speed Power Switching

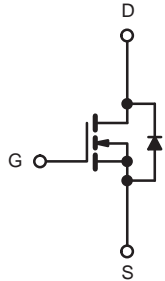
APPLICATIONS

- Power tools
- Synchronous rectification
- Hard Switching and High Speed Circuit
- DC/DCin Telecoms and Industrial

TO-220 Pin Configuration



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	180
		$T_C = 100$ °C	122
Pulsed Drain Current ($t = 100$ μ s)	I_{DM}	540	A
Avalanche Current	I_{AS}	L = 0.1 mH	152
Single Avalanche Energy ^a			E_{AS}
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	305 ^b
		$T_C = 100$ °C	195 ^b
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^c	R_{thJA}	60	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.45	

Notes

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

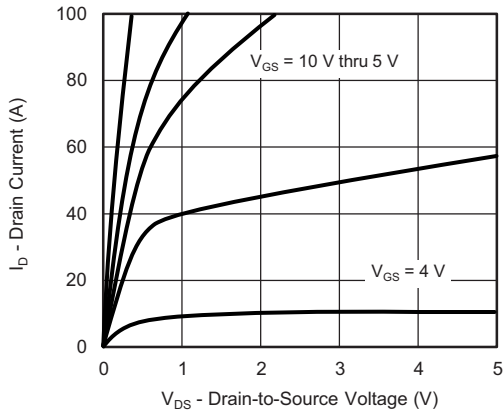
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	150	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 150 V, V _{GS} = 0 V, T _J = 100 °C	-	-	100	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	180	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A	-	4.9	6.0	mΩ
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 20 A	-	72	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 75 V, f = 1 MHz	-	6120	-	pF
Output Capacitance	C _{oss}		-	495	-	
Reverse Transfer Capacitance	C _{rss}		-	20	-	
Total Gate Charge ^c	Q _g	V _{DS} = 75 V, V _{GS} = 10 V, I _D = 20 A	-	98	-	nC
Gate-Source Charge ^c	Q _{gs}		-	23	-	
Gate-Drain Charge ^c	Q _{gd}		-	15	-	
Gate Resistance	R _g	f = 1 MHz	-	2.5	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 75 V, I _D = 20 A, R _g = 6Ω V _{GEN} = 10 V	-	21	-	ns
Rise Time ^c	t _r		-	25	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	49	-	
Fall Time ^c	t _f		-	15	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	180	A
Pulsed Current (t = 100 μs)	I _{SM}		-	-	540	A
Forward Voltage ^a	V _{SD}	I _F = 20 A, V _{GS} = 0 V	-	-	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 500 A/μs	-	88	-	ns
Reverse Recovery Charge	Q _{rr}		-	979	-	nC

Notes

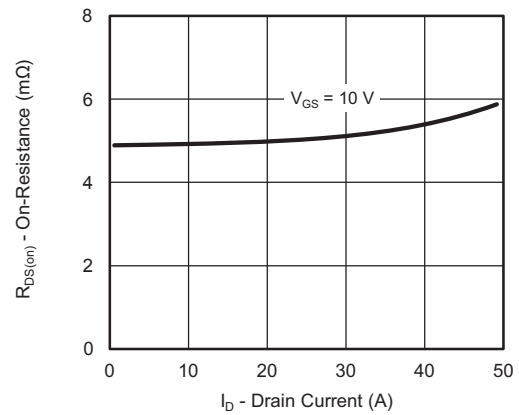
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

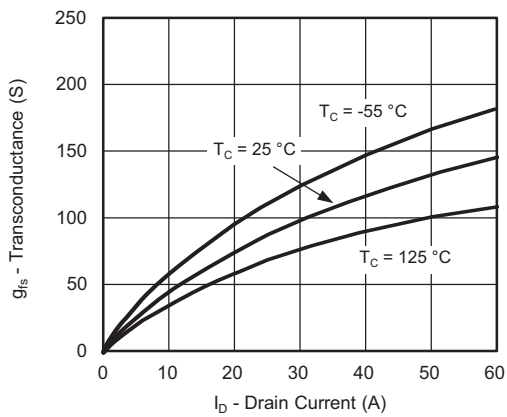
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



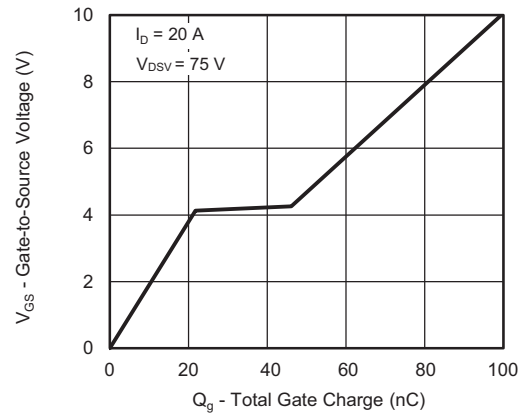
Output Characteristics



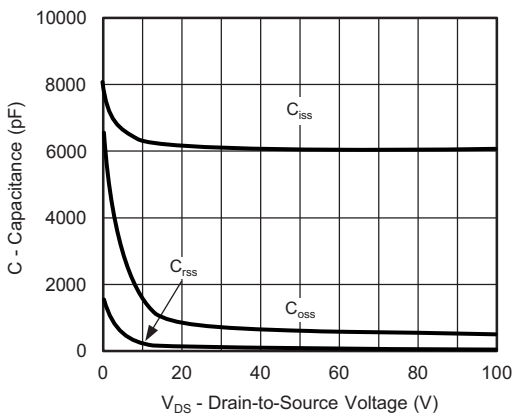
On-Resistance vs. Drain Current



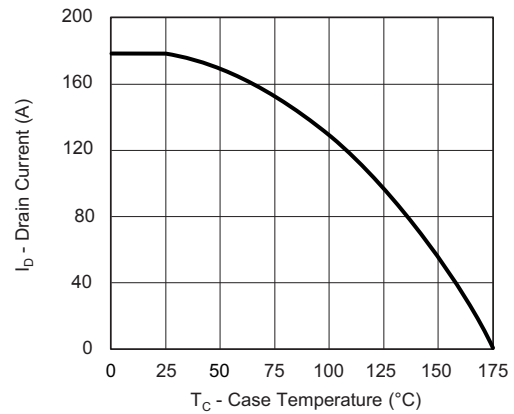
Transconductance



Gate Charge

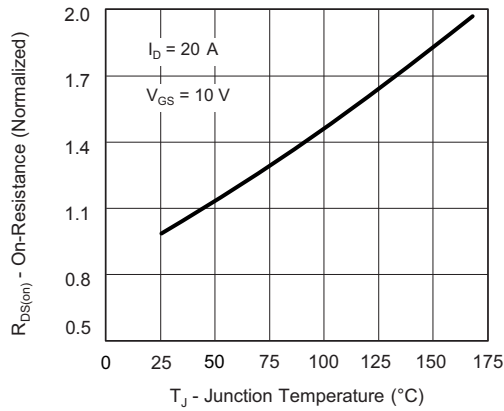


Capacitance

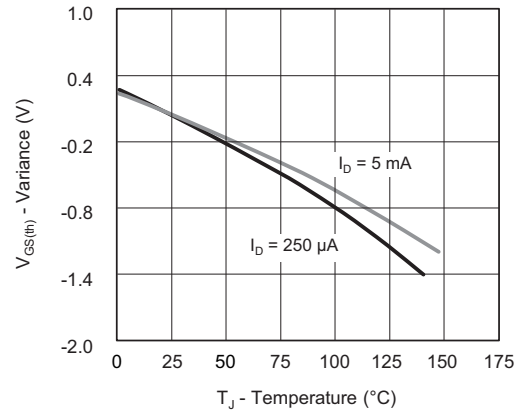


Current De-Rating

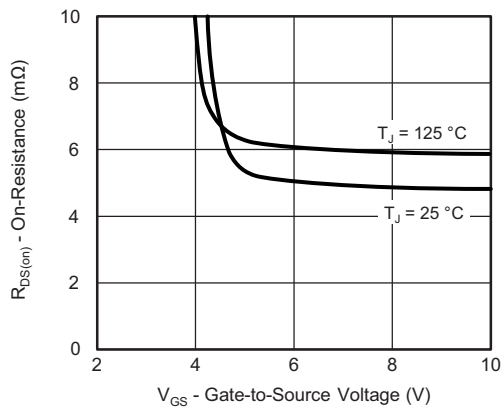
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



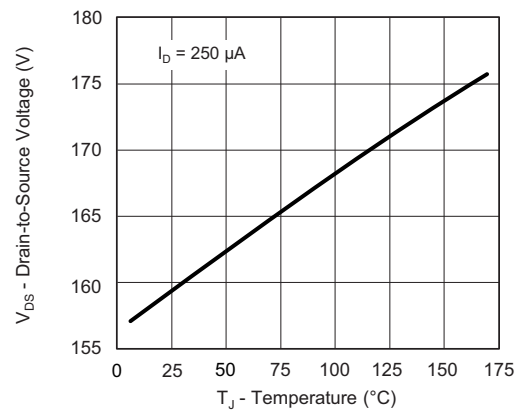
On-Resistance vs. Junction Temperature



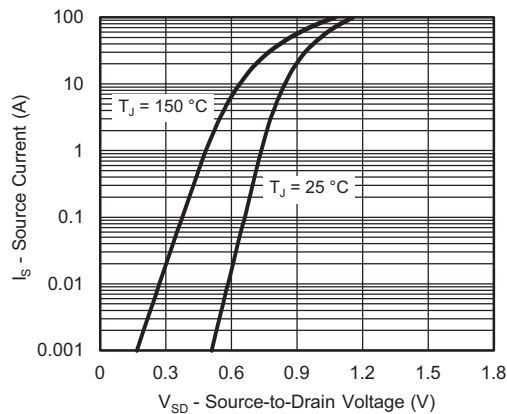
Threshold Voltage



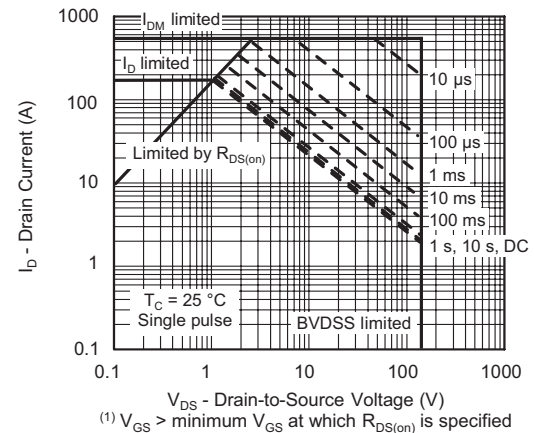
On-Resistance vs. Gate-to-Source Voltage



Drain Source Breakdown vs. Junction Temperature



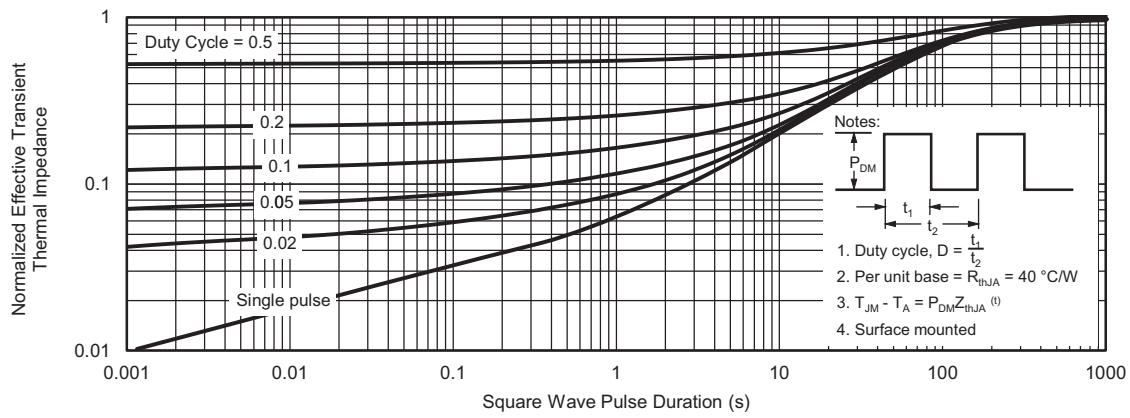
Source Drain Diode Forward Voltage



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

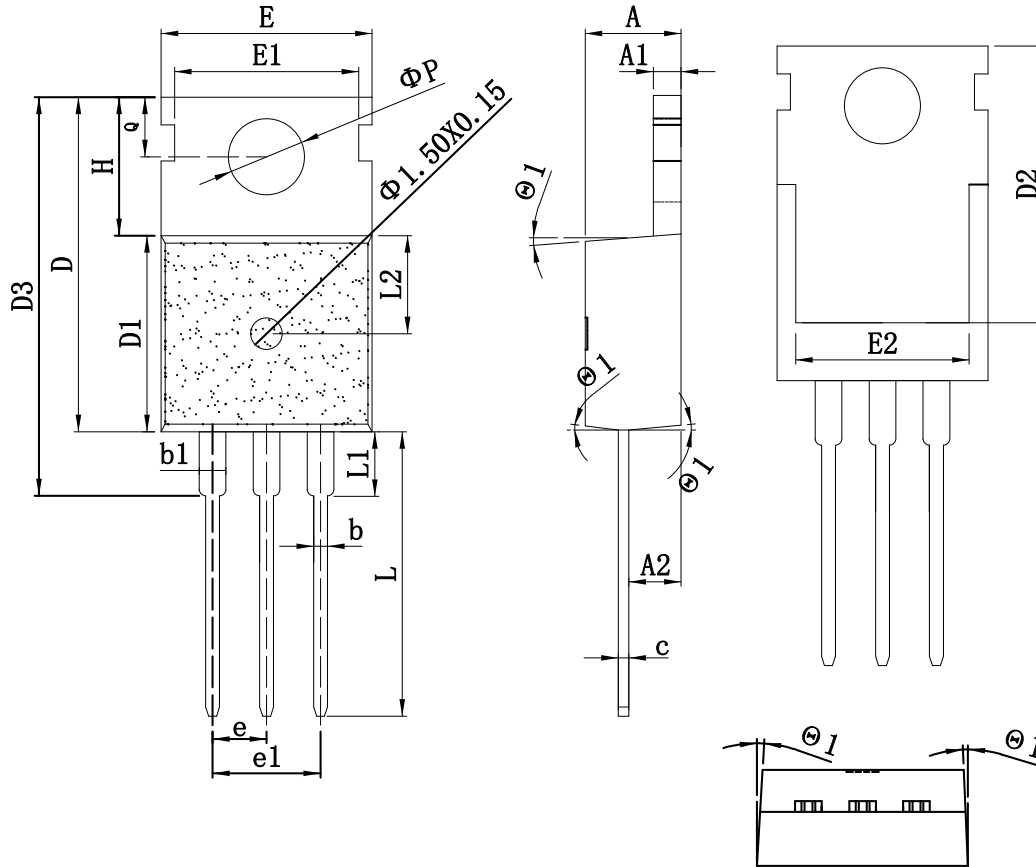
Safe Operating Area

THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

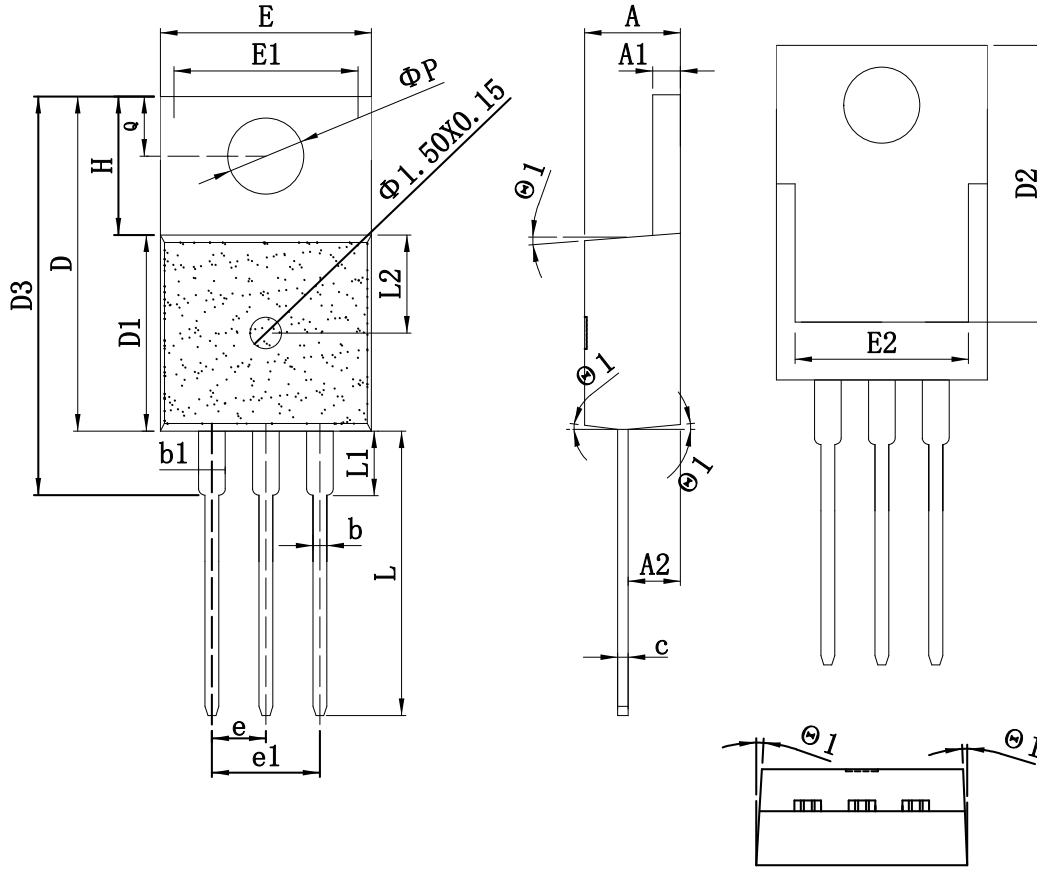
TO-220_3L-A PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	ϕP	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	θ	2°	-	7°

TO-220_3L-B PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	ϕP	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	θ	2°	-	7°

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