

P-Channel 150 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 150	0.185 at V _{GS} = - 10 V	- 30	37 nC

FEATURES

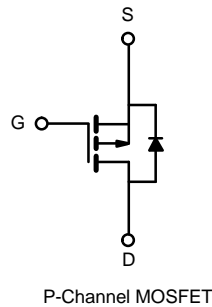
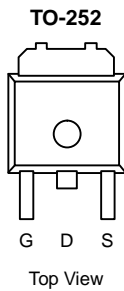
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT

APPLICATIONS

- Active Clamp in Intermediate DC/DC Power Supplies
- H-Bridge High Side Switch for Lighting Application



ABSOLUTE MAXIMUM RATINGS (T_A = 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	- 30
		T _C = 70 °C	- 26.3
		T _A = 25 °C	- 3.4 ^{a, b}
		T _A = 70 °C	- 2.5 ^{a, b}
Pulsed Drain Current	I _{DM}	- 120	A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 30
		T _A = 25 °C	- 4.3 ^{a, b}
Avalanche Current	I _{AS}	29	
Single-Pulse Avalanche Energy	E _{AS}	103	mJ
Maximum Power Dissipation	P _D	T _C = 25 °C	108
		T _C = 70 °C	99
		T _A = 25 °C	5.9 ^{a, b}
		T _A = 70 °C	4.8 ^{a, b}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 50 to 150	°C
Soldering Recommendations (Peak Temperature)		260	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

b. t = 10 s.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	t ≤ 10 s	R _{thJA}	35	60	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R _{thJC}	0.6	1.5	

Notes:

- a. Surface mounted on 1" x 1" FR4 board.
b. Maximum under steady state conditions is 81 °C/W.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)

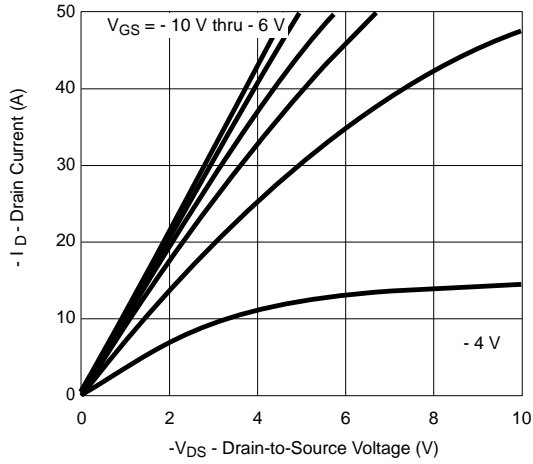
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = - 250 μA	- 150			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = - 250 μA		- 168		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.6		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 2		- 4	V
Gate-Source 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} = - 120 V, V _{GS} = 0 V, T _J = 55 °C			- 10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ - 5 V, V _{GS} = - 10 V	- 30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 5 A		0.185	0.225	Ω
Forward Transconductance ^a	g _{fs}	V _{DS} = - 5 V, I _D = - 5 A		15		S
Dynamic^b						
Input Capacitance	C _{iss}	V _{DS} = - 75 V, V _{GS} = 0 V, f = 1 MHz		1208		pF
Output Capacitance	C _{oss}			155		
Reverse Transfer Capacitance	C _{rss}			66		
Total Gate Charge	Q _g	V _{DS} = - 75 V, V _{GS} = - 10 V, I _D = - 5 A		37		nC
Gate-Source Charge	Q _{gs}			10		
Gate-Drain Charge	Q _{gd}			18		
Gate Resistance	R _g	f = 1 MHz		6		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 75 V, R _L = 25 Ω I _D ≅ - 5 A, V _{GEN} = - 10 V, R _g = 1 Ω		22		ns
Rise Time	t _r			45		
Turn-Off Delay Time	t _{d(off)}			53		
Fall Time	t _f			28		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			- 30	A
Pulse Diode Forward Current ^a	I _{SM}				- 120	
Body Diode Voltage	V _{SD}	I _S = - 5 A		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 20 A, di/dt = 100 A/μs, T _J = 25 °C		92		ns
Body Diode Reverse Recovery Charge	Q _{rr}			118		nC
Reverse Recovery Fall Time	t _a			37		ns
Reverse Recovery Rise Time	t _b			31		

Notes:

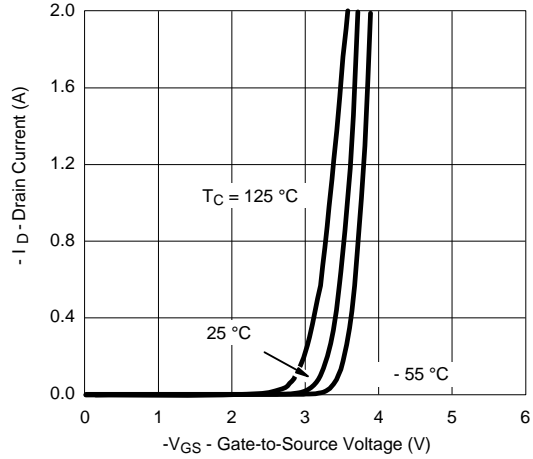
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

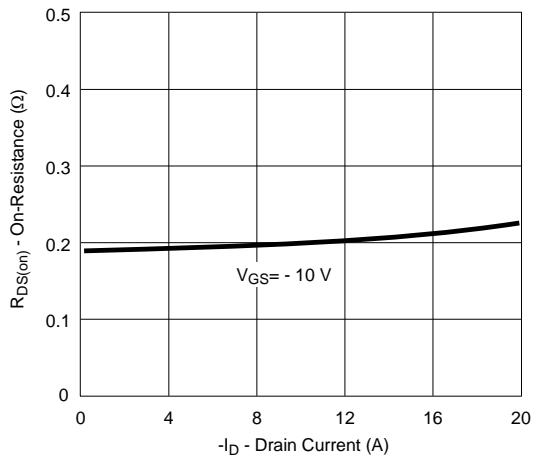
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



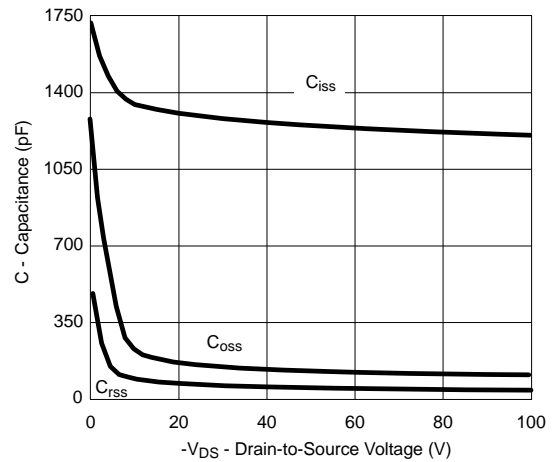
Output Characteristics



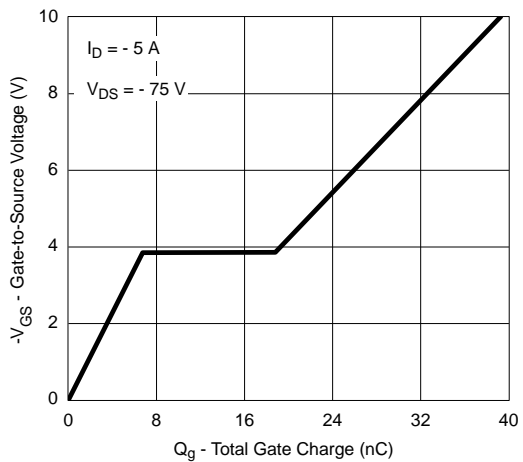
Transfer Characteristics



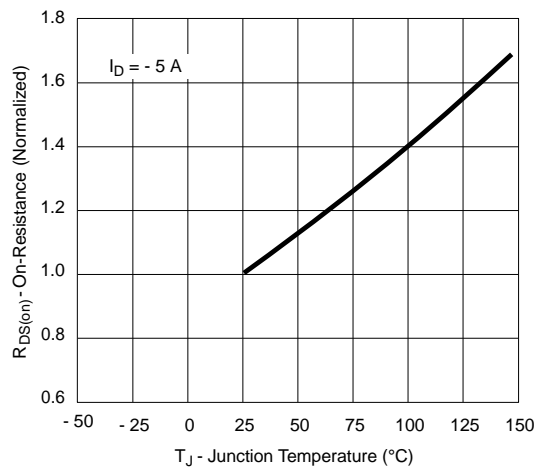
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

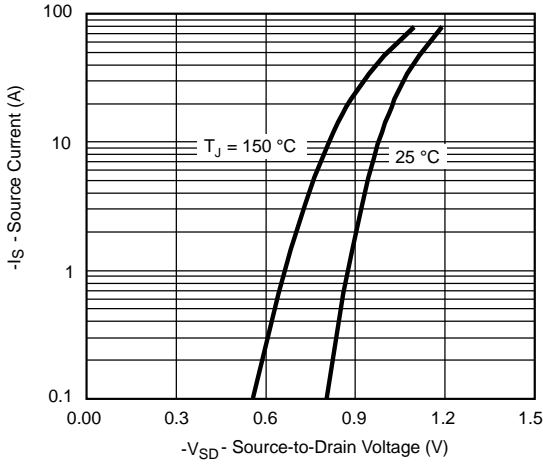


Gate Charge

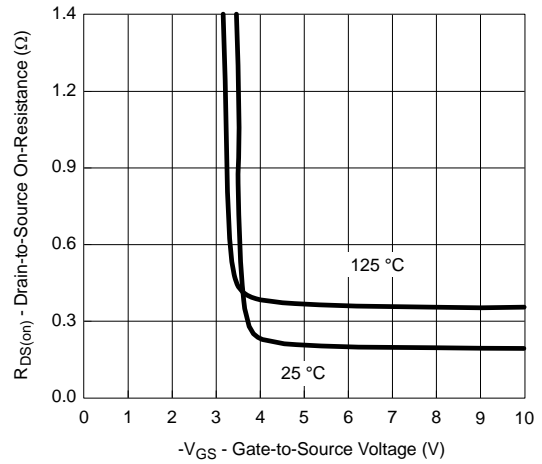


On-Resistance vs. Junction Temperature

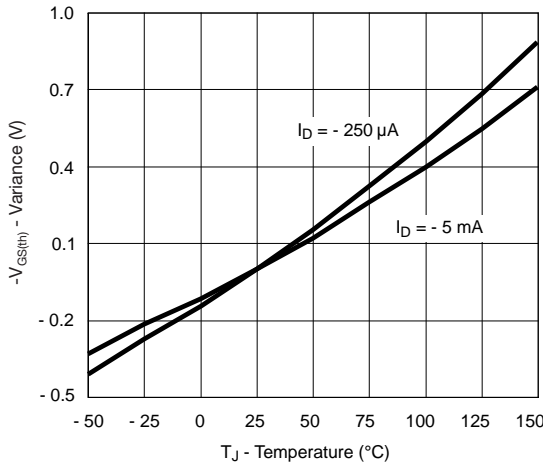
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



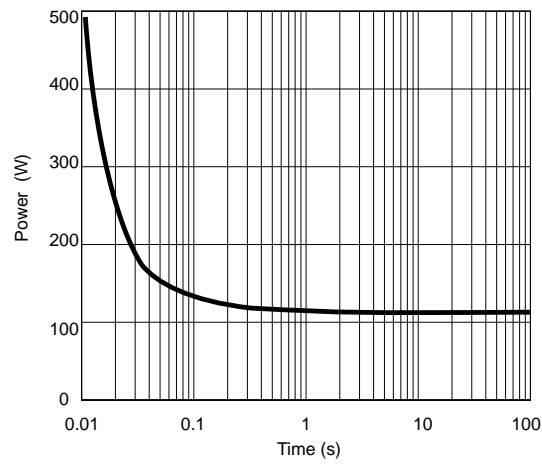
Source-Drain Diode Forward Voltage



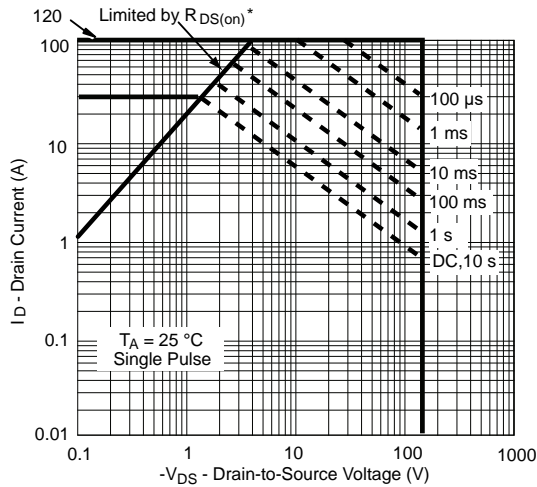
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



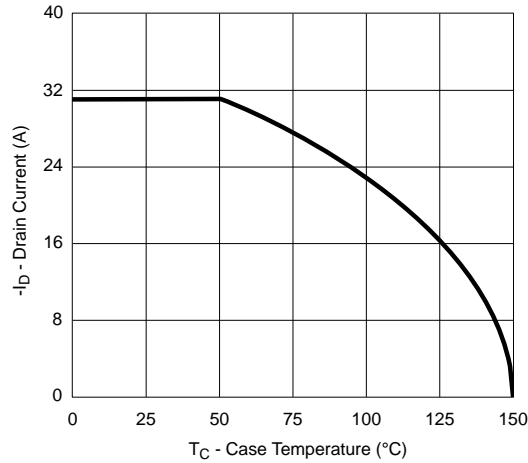
Single Pulse Power, Junction-to-Case



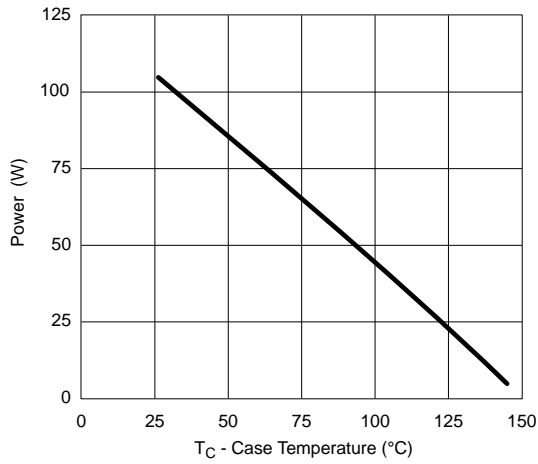
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

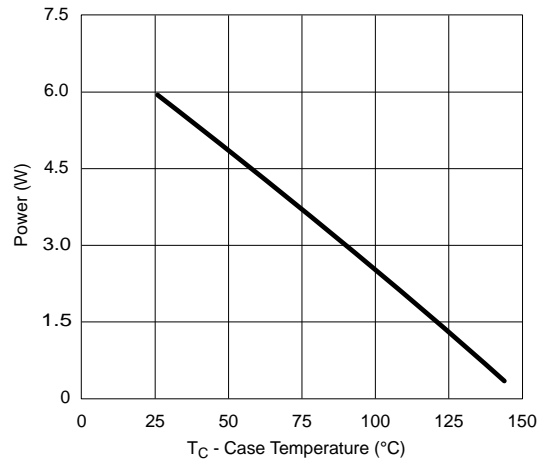
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



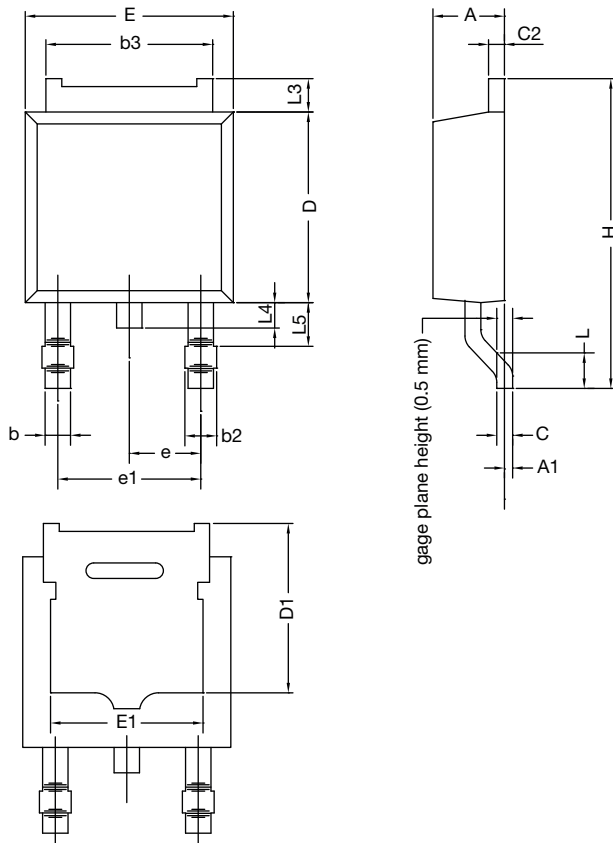
Power, Junction-to-Case



Power, Junction-to-Ambient

* The power dissipation PD is based on T_{J(max)} = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TO-252AA CASE OUTLINE

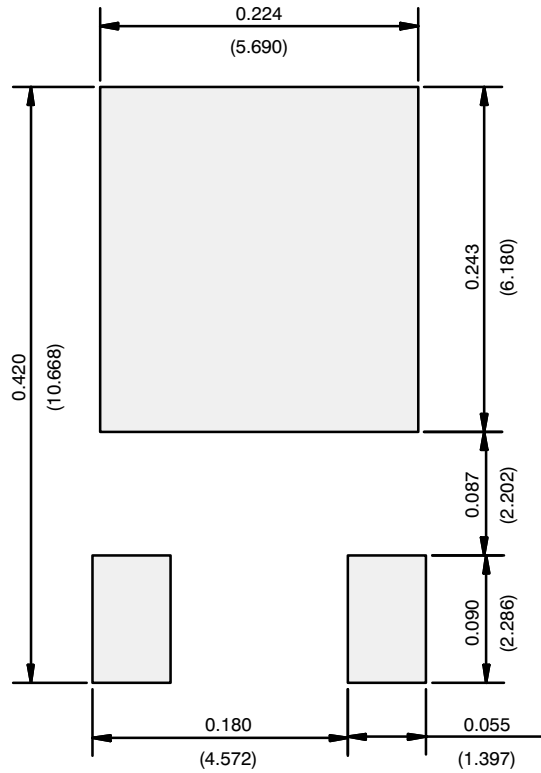


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.14	1.52	0.045	0.060
ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347				

Note

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)

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