IRLR2705TRPBF-VB Datasheet

N-Channel 60-V (D-S) MOSFET

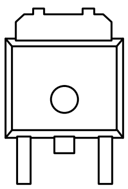
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)[a]
60	0.025 at V_{GS} = 10 V	45
	0.030 at V_{GS} = 4.5 V	40

FEATURES

- Trench Power MOSFET
- 175 °C Junction Temperature

Pb Available
RoHS* COMPLIANT

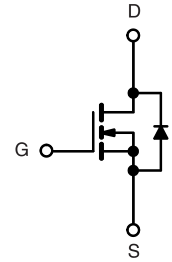
TO-252



G D S

Top View

Drain Connected to Tab



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_C = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (T_J = 175 °C)[b]	T_C = 25 °C	I_D	45	A
	T_C = 100 °C		35	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)		I_S	23	
Avalanche Current		I_{AS}	20	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E_{AS}	20	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	100	W
	T_A = 25 °C		3[a]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	18	22	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	3.2	4	

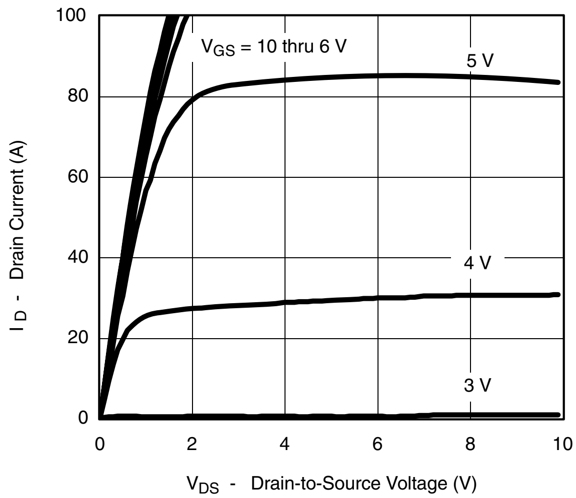
Notes:
a. Surface Mounted on 1" x 1" FR4 board, t ≤ 10 sec.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min**	**Typ**[a]	**Max**	**Unit**
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.0	2.0	3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 175 °C			250	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	50			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A		0.025		Ω
		V_{GS} = 10 V, I_D = 15 A, T_J = 125 °C		0.055		
		V_{GS} = 10 V, I_D = 15 A, T_J = 175 °C		0.069		
		V_{GS} = 4.5 V, I_D = 10 A		0.030		
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 15 A		20		S
Dynamic[a]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1500		pF
Output Capacitance	C_{oss}			140		
Reverse Transfer Capacitance	C_{rss}			60		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 23 A		11	17	nC
Gate-Source Charge[c]	Q_{gs}			3		
Gate-Drain Charge[c]	Q_{gd}			3		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 1.3 Ω I_D ≅ 23 A, V_{GEN} = 10 V, R_g = 2.5 Ω		8	15	ns
Rise Time[c]	t_r			15	25	
Turn-Off Delay Time[c]	$t_{d(off)}$			30	45	
Fall Time[c]	t_f			25	40	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)						
Pulsed Current	I_{SM}				50	A
Diode Forward Voltage	V_{SD}	I_F = 15 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 15 A, di/dt = 100 A/µs		30	60	ns

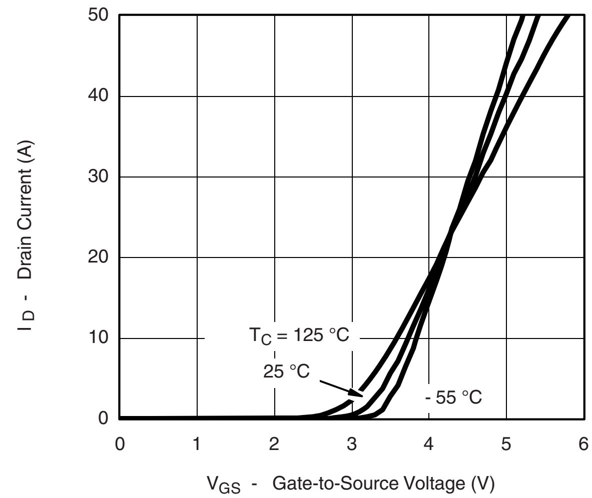
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
c. Independent of operating temperature.

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.

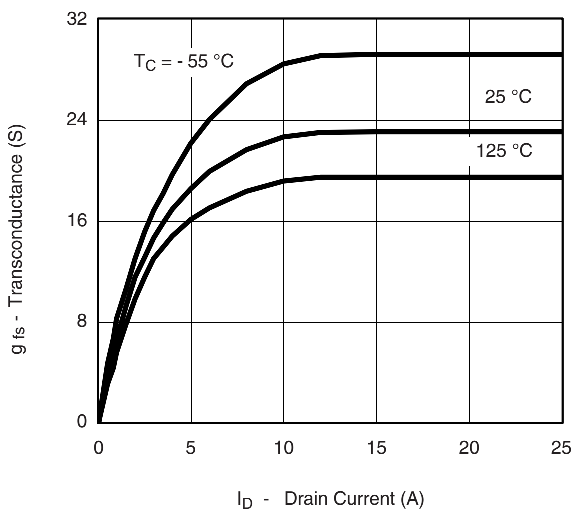
TYPICAL CHARACTERISTICS 25 °C unless noted



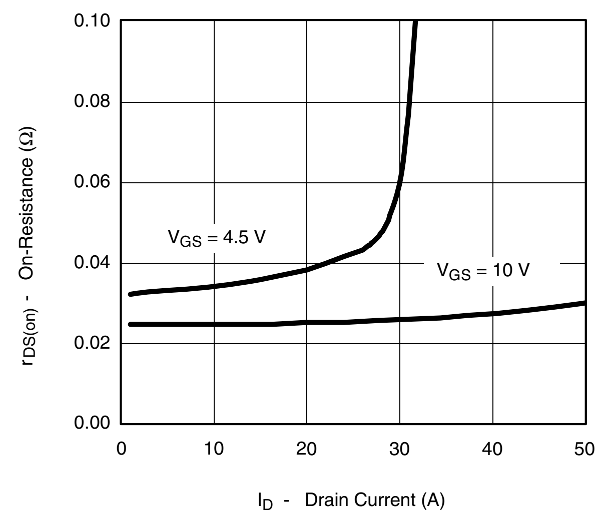
Output Characteristics



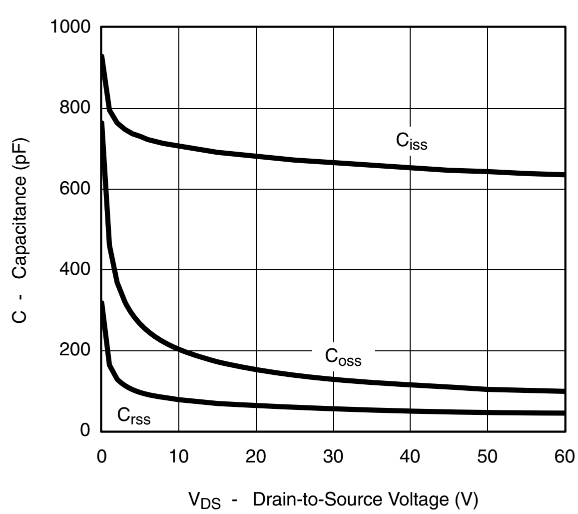
Transfer Characteristics



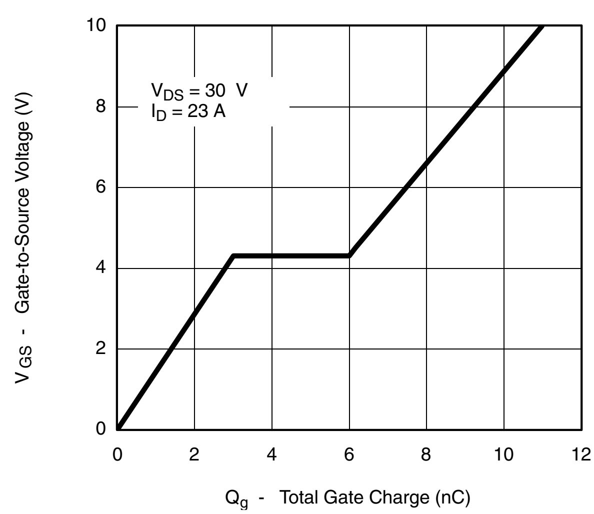
Transconductance



On-Resistance vs. Drain Current

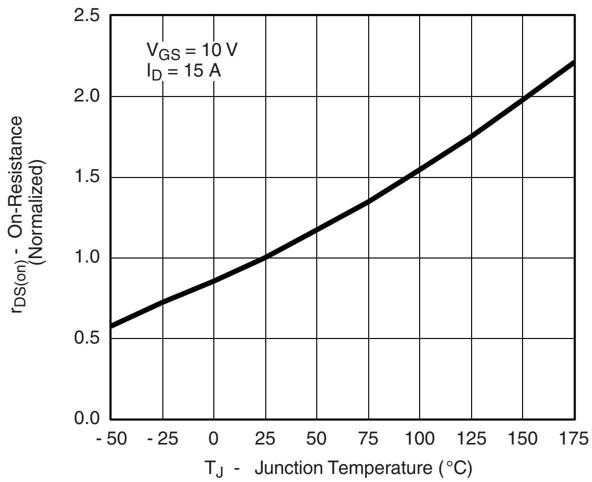


Capacitance

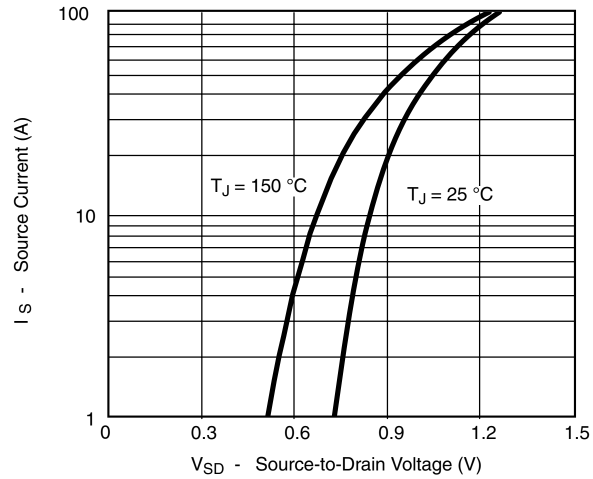


Gate Charge

TYPICAL CHARACTERISTICS 25 °C unless noted

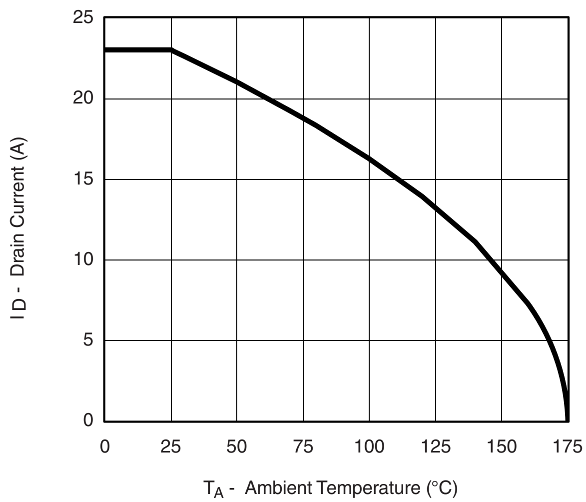


On-Resistance vs. Junction Temperature

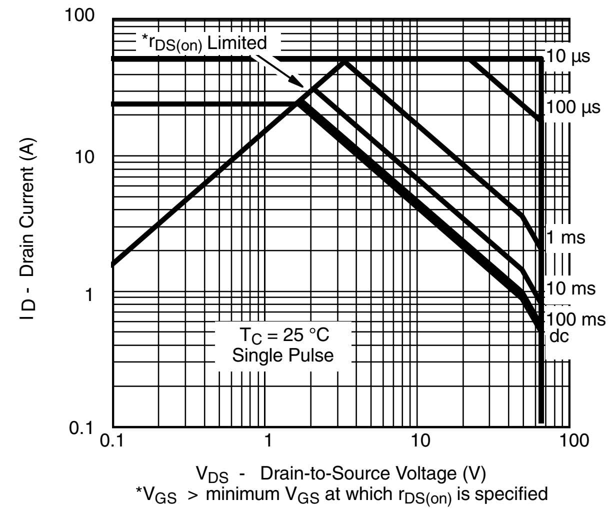


Source-Drain Diode Forward Voltage

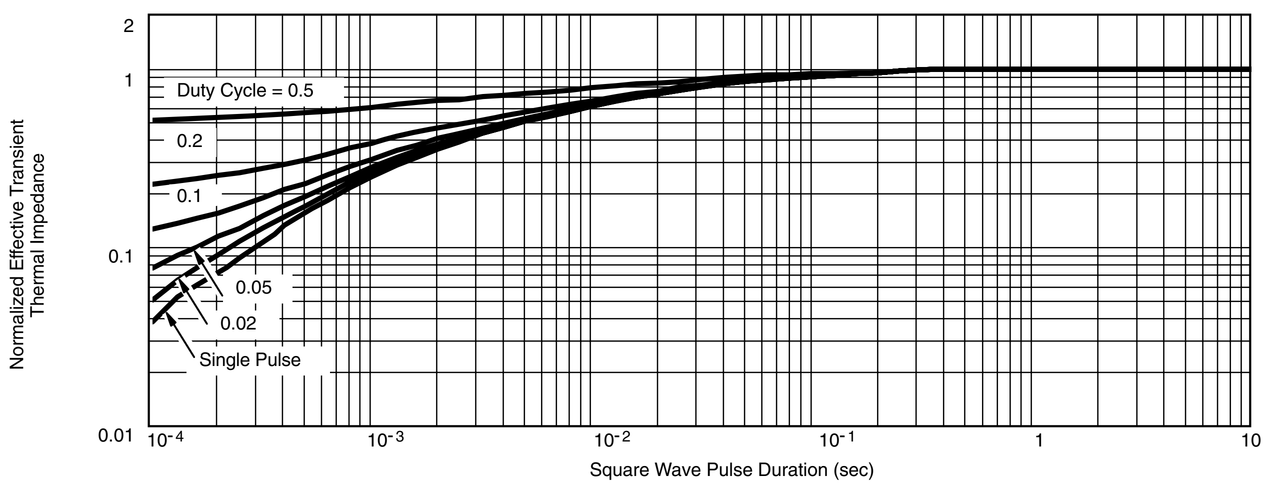
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

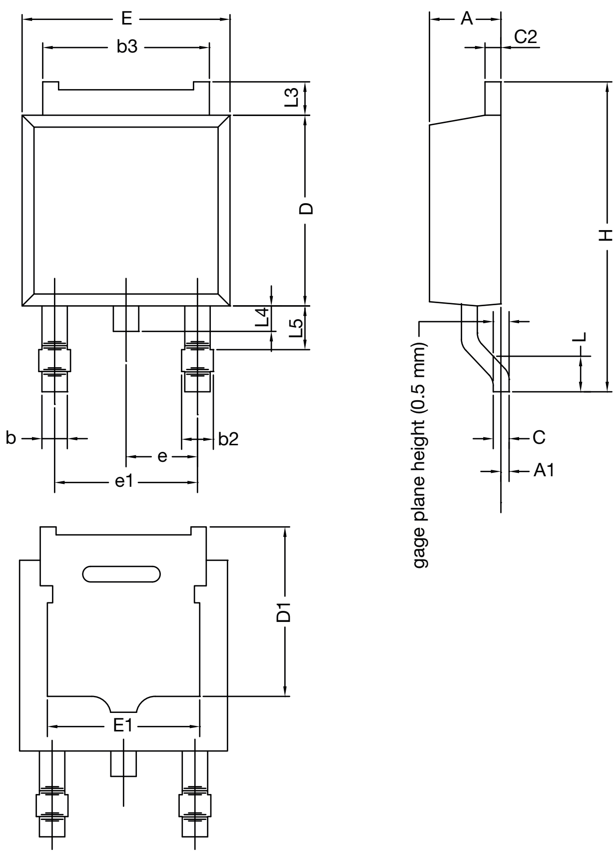


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-252AA CASE OUTLINE

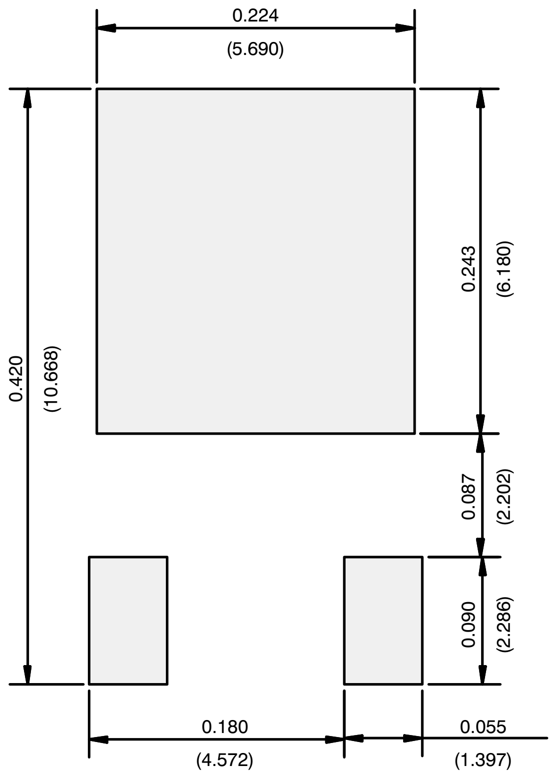


	MILLIMETERS		INCHES	
DIM.	**MIN.**	**MAX.**	**MIN.**	**MAX.**
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	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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