

IRF8010SPBF-VB Datasheet

N-Channel 100-V (D-S) MOSFET

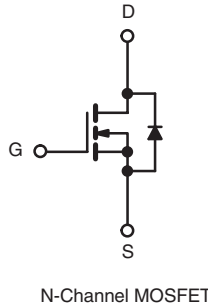
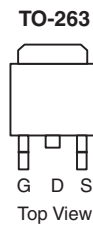
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
100	0.010 at $V_{GS} = 10$ V	100
	0.023 at $V_{GS} = 4.5$ V	85

FEATURES

- Trench Power MOSFET
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT



ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °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)	$T_C = 25$ °C	I_D	100	A
	$T_C = 125$ °C		75 ^a	
Pulsed Drain Current		I_{DM}	300	
Avalanche Current		I_{AS}	75	
Single Pulse Avalanche Energy ^b		E_{AS}	280	mJ
Maximum Power Dissipation ^b	$T_C = 25$ °C (TO-220AB and TO-263)	P_D	250 ^c	W
	$T_A = 25$ °C (TO-263) ^d		3.75	
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 (TO-263) ^d	R_{thJA}	40	°C/W
	Free Air (TO-220AB)		62.5	
Junction-to-Case		R_{thJC}	0.6	

Notes:

- Pulse test; pulse width ≤ 300 μ s, 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.

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	100			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} = 100 V, V _{GS} = 0 V			1	μA
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 175 °C			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = ≥ 5 V, V _{GS} = 10 V	120			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		0.010		Ω
		V _{GS} = 4.5 V, I _D = 20 A		0.023		
		V _{GS} = 10 V, I _D = 30 A, T _J = 125 °C		0.020		
		V _{GS} = 10 V, I _D = 30 A, T _J = 175 °C		0.030		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	25			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		6550		pF
Output Capacitance	C _{oss}			665		
Reverse Transfer Capacitance	C _{rss}			265		
Total Gate Charge ^c	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 85 A		105	160	nC
Gate-Source Charge ^c	Q _{gs}			17		
Gate-Drain Charge ^c	Q _{gd}			23		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 50 V, R _L = 0.6 Ω I _D ≅ 85 A, V _{GEN} = 10 V, R _g = 2.5 Ω		12	25	ns
Rise Time ^c	t _r			90	135	
Turn-Off DelayTime ^c	t _{d(off)}			55	85	
Fall Time ^c	t _f			130	195	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				85	A
Pulsed Current	I _{SM}				240	
Forward Voltage ^a	V _{SD}	I _F = 85 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, dI/dt = 100 A/μs		85	140	ns
Peak Reverse Recovery Current	I _{RM(REC)}			4.5	7	A
Reverse Recovery Charge	Q _{rr}			0.17	0.35	μC

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.

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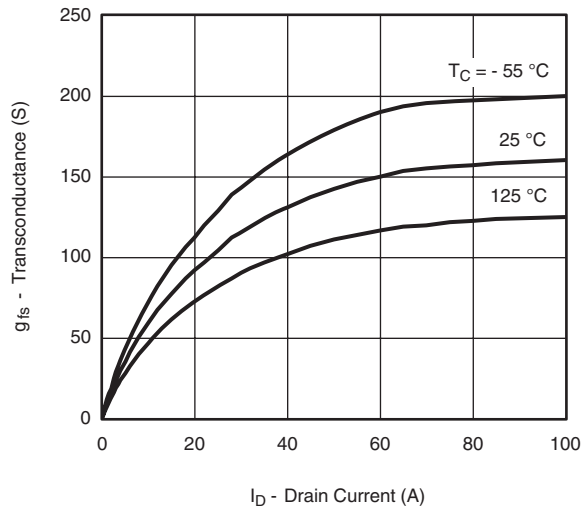
TYPICAL CHARACTERISTICS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted



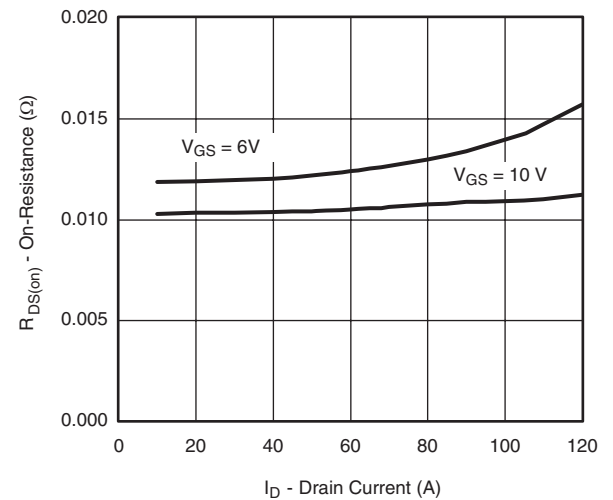
Output Characteristics



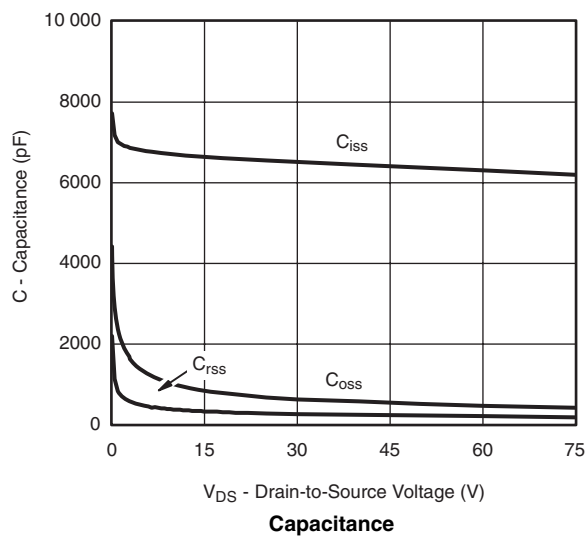
Transfer Characteristics



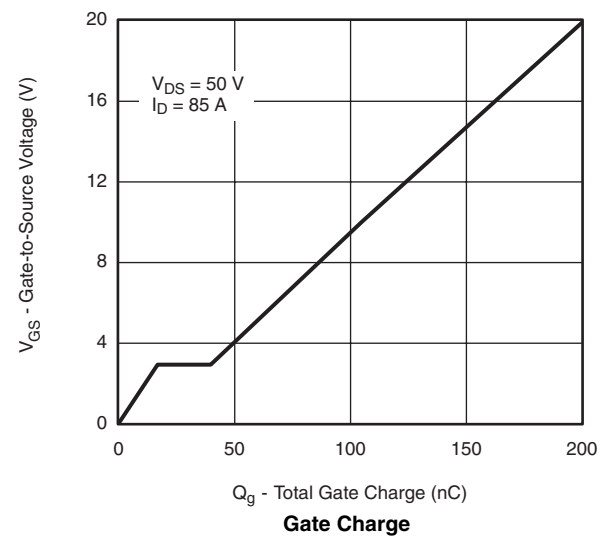
Transconductance



On-Resistance vs. Drain Current



Capacitance



Gate Charge

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



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



Avalanche Current vs. Time

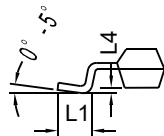
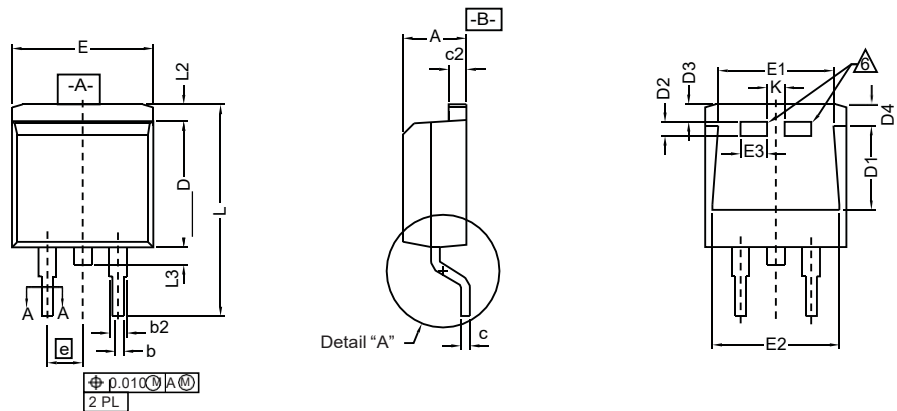


T_J - Drain-Source Breakdown vs. Junction-Temperature

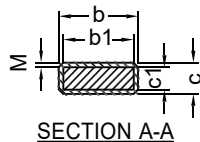
THERMAL RATINGS



TO-263 (D²PAK): 3-LEAD



DETAIL A (ROTATED 90°)



SECTION A-A

DIM.		INCHES		MILLIMETERS	
		MIN.	MAX.	MIN.	MAX.
A		0.160	0.190	4.064	4.826
b		0.020	0.039	0.508	0.990
b1		0.020	0.035	0.508	0.889
b2		0.045	0.055	1.143	1.397
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2		0.045	0.055	1.143	1.397
D		0.340	0.380	8.636	9.652
D1		0.220	0.240	5.588	6.096
D2		0.038	0.042	0.965	1.067
D3		0.045	0.055	1.143	1.397
D4		0.044	0.052	1.118	1.321
E		0.380	0.410	9.652	10.414
E1		0.245	-	6.223	-
E2		0.355	0.375	9.017	9.525
E3		0.072	0.078	1.829	1.981
e		0.100 BSC		2.54 BSC	
K		0.045	0.055	1.143	1.397
L		0.575	0.625	14.605	15.875
L1		0.090	0.110	2.286	2.794
L2		0.040	0.055	1.016	1.397
L3		0.050	0.070	1.270	1.778
L4		0.010 BSC		0.254 BSC	
M		-	0.002	-	0.050
ECN: T13-0707-Rev. K, 30-Sep-13					
DWG: 5843					

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Notes

- Plane B includes maximum features of heat sink tab and plastic.
- No more than 25 % of L1 can fall above seating plane by max. 8 mils.
- Pin-to-pin coplanarity max. 4 mils.
- *: Thin lead is for SUB, SYB.
Thick lead is for SUM, SYM, SQM.
- Use inches as the primary measurement.
-  This feature is for thick lead.

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