

IRFU3505PBF-VB Datasheet

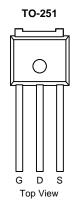
N-Channel 60 V (D-S) MOSFET

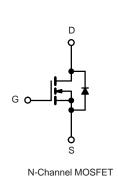
PRODUCT SUMMARY				
V _{DS} (V)	$R_{DS(on)}$ (Ω)	I _D (A) ^a		
60	0.012at V _{GS} = 10 V	55		
00	0.015 at V _{GS} = 4.5 V	47		

FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET
- Material categorization:







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 _{.1} = 175 °C) ^b	T _C = 25 °C		55		
Continuous Drain Current (1) = 175 °C)	T _C = 100 °C	I _D	46 ^a		
Pulsed Drain Current	I _{DM}	110	Α		
Continuous Source Current (Diode Conduction)	I _S	50 ^a			
Avalanche Current	I _{AS}	I _{AS} 50			
Single Avalanche Energy (Duty Cycle ≤ 1 %) L = 0.1 mH		E _{AS}	125	mJ	
Maximum Power Dissipation	T _C = 25 °C	P _D	136	W	
Maximum Fower Dissipation	T _A = 25 °C	' D	3 ^b , 8.3 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Marrian una lumation ta Analianta	t ≤ 10 sec	R _{thJA}	15	18		
Maximum Junction-to-Ambient ^a	Steady State	'`thJA	40	50	°C/W	
Maximum Junction-to-Case		R _{thJC}	0.85	1.1		

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- c. $t \le 10$ s.

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Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	60			V	
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu\text{A}$			3	V	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V _{DS} = 60 V, V _{GS} = 0 V	1		1		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125 °C			50	μA	
		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	60			Α	
		V _{GS} = 10 V, I _D = 20 A		0.012			
D : 0	D	V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.013		Ω	
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.017			
		$V_{GS} = 4.5 \text{ V}, I_D = 15 \text{ A}$		0.015			
Forward Transconductance ^b	9 _{fs}	$V_{DS} = 15 \text{ V}, I_{D} = 20 \text{ A}$		60		S	
Dynamic			•				
Input Capacitance	C _{iss}			3650			
Output Capacitance	C _{oss}	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		570		pF	
Reverse Transfer Capacitance	C _{rss}			325			
Total Gate Charge ^c	Qg			46			
Gate-Source Charge ^c	Q_{gs}	$V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A}$		10		nC	
Gate-Drain Charge ^c	Q _{gd}			12			
Turn-On Delay Time ^c	t _{d(on)}			10	20		
Rise Time ^c	t _r	V_{DD} = 30 V, R_L = 0.6 Ω $I_D \cong$ 50 A, V_{GEN} = 10 V, R_g = 2.5 Ω		15	25		
Turn-Off Delay Time ^c	t _{d(off)}			35	50	ns	
Fall Time ^c	t _f			20	30		
Source-Drain Diode Ratings and Cha	aracteristics (T _C = 25 °C)		•			
Pulsed Current	I _{SM}				60	Α	
Diode Forward Voltage	V_{SD}	I _F = 20 A, V _{GS} = 0 V		1	1.5	V	
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		45	100	ns	

Notes:

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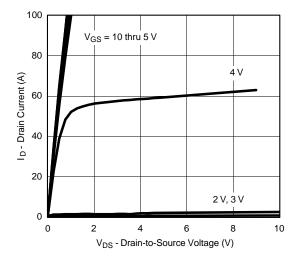
- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- c. Independent of operating temperature.

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.

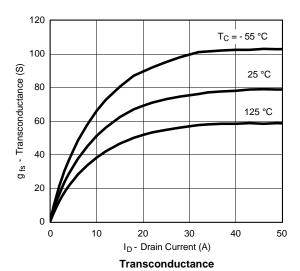
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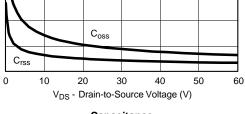
TYPICAL CHARACTERISTICS (25 °C unless noted)



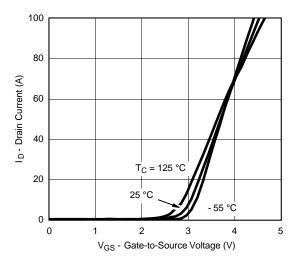
Output Characteristics



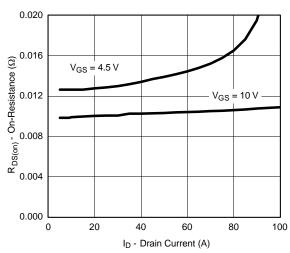
4200 3600 C_{iss} C - Capacitance (pF) 3000 2400



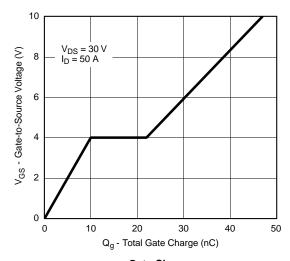
Capacitance



Transfer Characteristics



On-Resistance vs. Drain Current



Gate Charge

4800

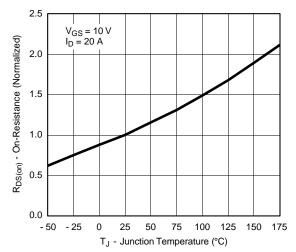
1800 1200

600

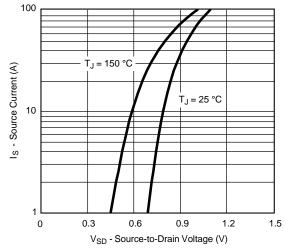
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TYPICAL CHARACTERISTICS (25 °C unless noted)



On-Resistance vs. Junction Temperature

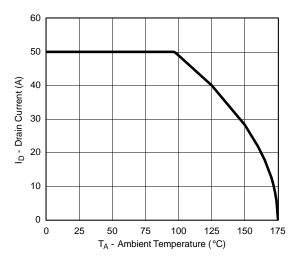


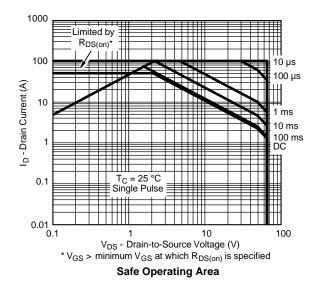
Source-Drain Diode Forward Voltage

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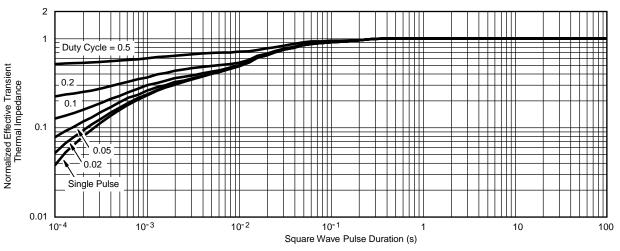


THERMAL RATINGS





Maximum Drain Current vs. Ambient Temperature



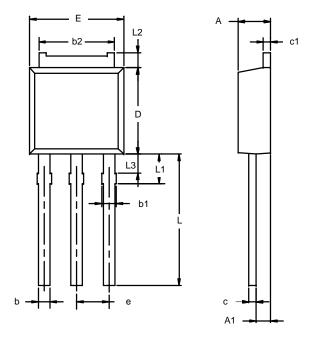
Normalized Thermal Transient Impedance, Junction-to-Case

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TO-251AA (DPAK)



Note: Dimension L3 is for reference only.

	MILLIM	IETERS	INC	HES	
Dim	Min	Max	Min	Max	
Α	2.21	2.38	0.087	0.094	
A 1	0.89	1.14	0.035	0.045	
b	0.71	0.89	0.028	0.035	
b1	0.76	1.14	0.030	0.045	
b2	5.23	5.43	0.206	0.214	
С	0.46	0.58	0.018	0.023	
с1	0.46	0.58	0.018	0.023	
D	5.97	6.22	0.235	0.245	
Е	6.48	6.73	0.255	0.265	
е	2.28 BSC		BSC 0.090 BSC		
L	8.89	9.53	0.350	0.375	
L1	1.91	2.28	0.075	0.090	
L2	0.89	1.27	0.035	0.050	
L3	1.15	1.52	0.045	0.060	
ECN: S-03946—Rev. E, 09-Jul-01 DWG: 5346					

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