

IRFY140C-VB Datasheet N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY				
V _{(BR)DSS} (V)	I _D (A)			
100	0.127at V _{GS} = 10 V	18		

FEATURES

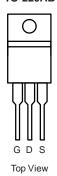
- Trench Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 % R_g Tested

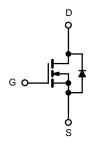


APPLICATIONS

• Isolated DC/DC Converters







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _C = 25 °C, unless otherwise noted					
Parameter	-	Symbol	Limit	Unit	
Drain-Source Voltage		V _{DS}	100	V	
Gate-Source Voltage		V _{GS}	± 20	V	
Continuous Drain Current (T _{.1} = 175 °C)	T _C = 25 °C	I-	18		
Continuous Diam Current (1) = 175 C)	T _C = 125 °C	I _D	15	A	
Pulsed Drain Current		I _{DM}	68		
Avalanche Current	L = 0.1 mH	I _{AS}	18		
Single Pulse Avalanche Energy ^b	L = 0.1 IIII1	E _{AS}	200	mJ	
	T _C = 25 °C	l p	105	10/	
Maximum Power Dissipation ^b	T _A = 25 °C ^d	P _D	3.75	W	
Operating Junction and Storage Temperature Ra	nge	T _J , T _{stq}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Limit	Unit		
Junction-to-Ambient	PCB Mount (TO-263) ^d	R _{thJA}	40	°C/W		
Junction-to-Case (Drain)			0.4	C/VV		

Notes:

- a. Package limited.
- b. Duty cycle \leq 1 %.
- c. See SOA curve for voltage derating.
- d. When Mounted on 1" square PCB (FR-4 material).



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{(BR)DSS}	$V_{DS} = 0 \text{ V}, I_{D} = 250 \mu\text{A}$	100		V		
Gate-Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \mu A$	V_{GS} , $I_D = 250 \mu\text{A}$ 2		4	7 V	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V			1	μА	
		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)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	120			Α	
		V _{GS} = 10 V, I _D = 20 A		0.127			
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.130		Ω	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.170			
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 20 A	25			S	
Dynamic ^b							
Input Capacitance	C _{iss}			1300		pF	
Output Capacitance	C _{oss}	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		260			
Reverse Transfer Capacitance	C _{rss}			110			
Total Gate Charge ^c	Q_g				28	nC	
Gate-Source Charge ^c	Q_{gs}	$V_{DS} = 100 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 65 \text{ A}$			4.8		
Gate-Drain Charge ^c	Q_{gd}				15		
Gate Resistance	R_{g}		0.5	1.7	3.3	Ω	
Turn-On Delay Time ^c	t _{d(on)}			8		ns	
Rise Time ^c	t _r	V_{DD} = 100 V, R_L = 1.5 Ω		120			
Turn-Off Delay Time ^c	t _{d(off)}	$I_D \cong 65 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		25			
Fall Time ^c	t _f			50			
Source-Drain Diode Ratings and Cha	aracteristics 7	_C = 25 °C ^b					
Continuous Current	Is			18		^	
Pulsed Current	I _{SM}			68		A	
Forward Voltage ^a	V _{SD}	I _F = 65 A, V _{GS} = 0 V		1.0	1.5	V	
Reverse Recovery Time	t _{rr}			130	200	ns	
Peak Reverse Recovery Current	I _{RM(REC)}	$I_F = 50 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{s}$		8	12	Α	
Reverse Recovery Charge	Q _{rr}			0.52	1.2	μC	

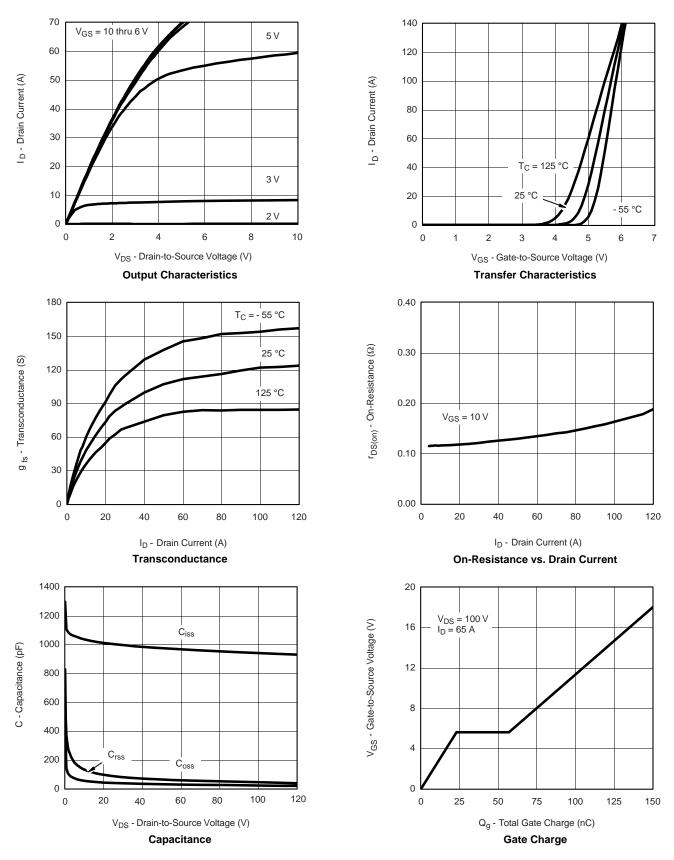
Notes

- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- b. Guaranteed by design, not subject to production testing.
- 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.

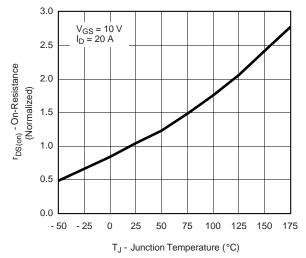


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

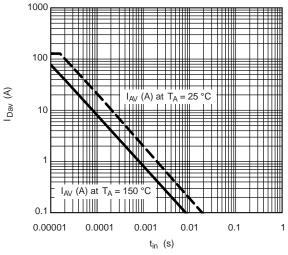




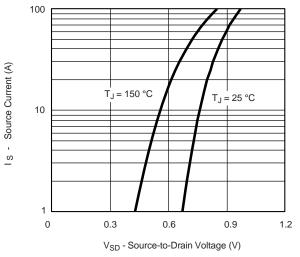
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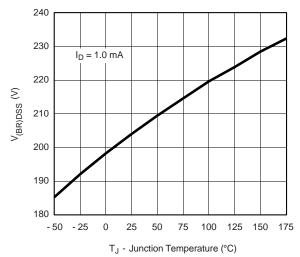
On-Resistance vs. Junction Temperature



Avalanche Current vs. Time



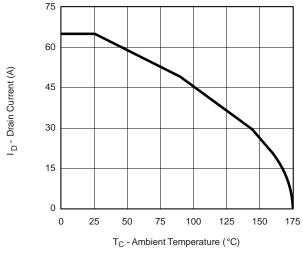
Source-Drain Diode Forward Voltage



Drain Source Breakdown vs. Junction Temperature



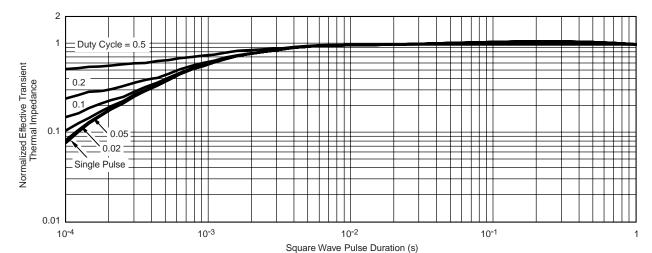
THERMAL RATINGS



1000 r_{DS(on)} Limited 10 µs 100 I_D - Drain Current (A) 10 T_C = 25 °C 10 ms 100 ms DC Single Pulse 0.1 0.1 100 1000 10 V_{DS} - Drain-to-Source Voltage (V) * V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified

Maximum Avalanche and Drain Current vs. Case Temperature

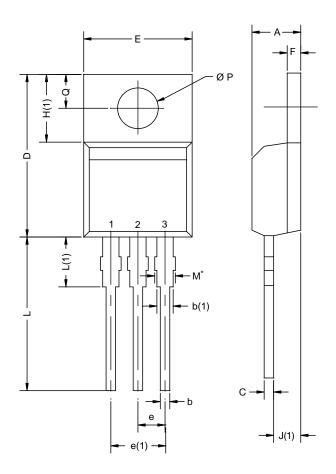
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



TO-220AB



	MILLIM	IETERS	INC	HES		
DIM.	MIN.	MAX.	MIN.	MAX.		
А	4.25	4.65	0.167	0.183		
b	0.69	1.01	0.027	0.040		
b(1)	1.20	1.73	0.047	0.068		
С	0.36	0.61	0.014	0.024		
D	14.85	15.49	0.585	0.610		
Е	10.04	10.51	0.395	0.414		
е	2.41	2.67	0.095	0.105		
e(1)	4.88	5.28	0.192	0.208		
F	1.14	1.40	0.045	0.055		
H(1)	6.09	6.48	0.240	0.255		
J(1)	2.41	2.92	0.095	0.115		
L	13.35	14.02	0.526	0.552		
L(1)	3.32	3.82	0.131	0.150		
ØΡ	3.54	3.94	0.139	0.155		
Q	2.60	3.00	0.102	0.118		
ECN: X12-0208-Rev. N, 08-Oct-12 DWG: 5471						

Notes

 $^{^{\}star}$ M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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