

HEXFET® Power MOSFET

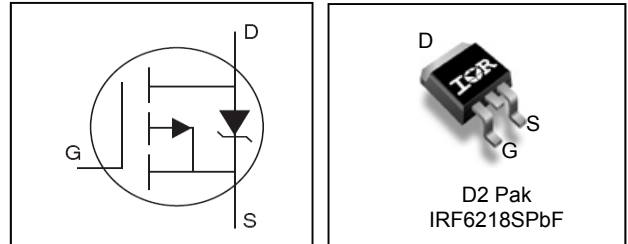
### Applications

- Reset Switch for Active Clamp Reset DC-DC converters

$V_{DSS}$	$R_{DS(on)} (max)$	$I_D$
-150V	150mΩ @ $V_{GS} = -10V$	-27A

### Benefits

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective  $C_{OSS}$  to Simplify Design (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current
- Lead-Free



<b>G</b>	<b>D</b>	<b>S</b>
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRF6218SPbF	D2-Pak	Tube	50	IRF6218SPbF
		Tape and Reel Left	800	IRF6218STRLPbF

### Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
$V_{DS}$	Drain-to-Source Voltage	-150	V
$V_{GS}$	Gate-to-Source Voltage	± 20	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	- 27	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-19	
$I_{DM}$	Pulsed Drain Current ①	- 110	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	250	W
	Linear Derating Factor	1.6	W/°C
dv/dt	Peak Diode Recovery dv/dt③	8.2	V/ns
$T_J$	Operating Junction and	-55 to + 175	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	

### Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑤	—	0.61	°C/W
$R_{\theta JA}$	Junction-to-Ambient ( PCB Mount, steady state) ⑥	—	40	

Notes ① through ⑥ are on page 2

**Static @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-150	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	-0.17	—	V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	120	150	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -16A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	-3.0	—	-5.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-25	μA	V <sub>DS</sub> = -120V, V <sub>GS</sub> = 0V
		—	—	-250		V <sub>DS</sub> = -120V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 150°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	-100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V <sub>GS</sub> = 20V

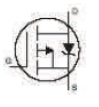
**Dynamic @ T<sub>J</sub> = 25°C (unless otherwise specified)**

g <sub>fs</sub>	Forward Trans conductance	11	—	—	S	V <sub>DS</sub> = -50V, I <sub>D</sub> = -16A
Q <sub>g</sub>	Total Gate Charge	—	71	110	nC	I <sub>D</sub> = -16A
Q <sub>gs</sub>	Gate-to-Source Charge	—	21	—		V <sub>DS</sub> = -120V
Q <sub>gd</sub>	Gate-to-Drain ('Miller') Charge	—	32	—		V <sub>GS</sub> = -10V ④
t <sub>d(on)</sub>	Turn-On Delay Time	—	21	—	ns	V <sub>DD</sub> = -75V
t <sub>r</sub>	Rise Time	—	70	—		I <sub>D</sub> = -16A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	35	—		R <sub>G</sub> = 3.9Ω
t <sub>f</sub>	Fall Time	—	30	—		V <sub>GS</sub> = -10V ④
C <sub>iss</sub>	Input Capacitance	—	2210	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	370	—		V <sub>DS</sub> = -25V
C <sub>riss</sub>	Reverse Transfer Capacitance	—	89	—		f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	2220	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = -1.0V, f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	170	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = -120V, f = 1.0MHz
C <sub>oss eff.</sub>	Effective Output Capacitance	—	340	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to -120V

**Avalanche Characteristics**

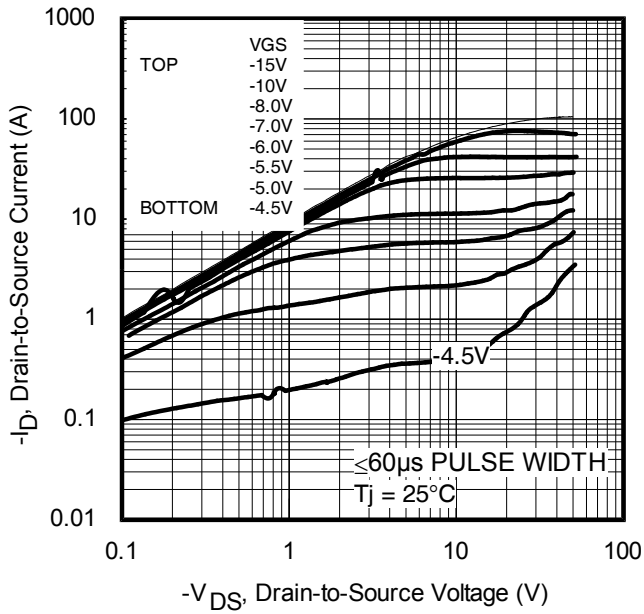
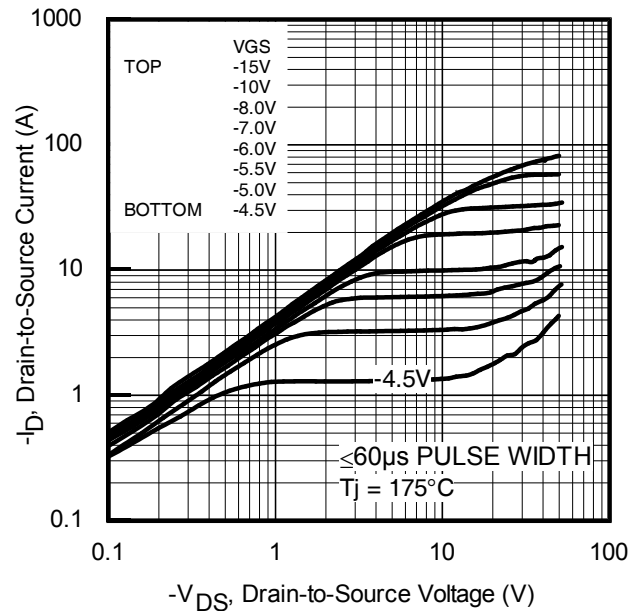
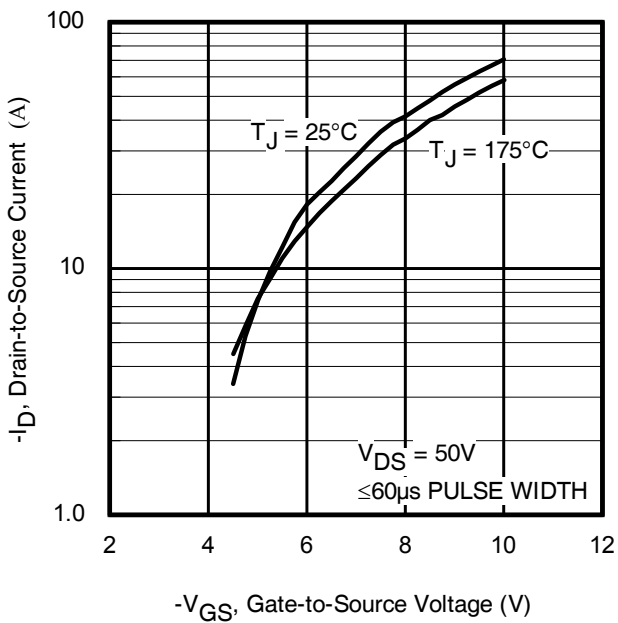
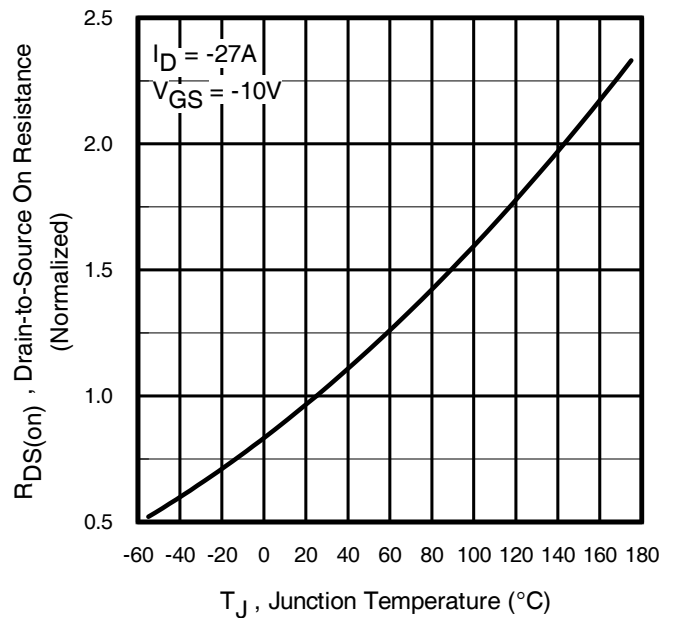
	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	210	mJ
I <sub>AR</sub>	Avalanche Current ①	—	-16	A

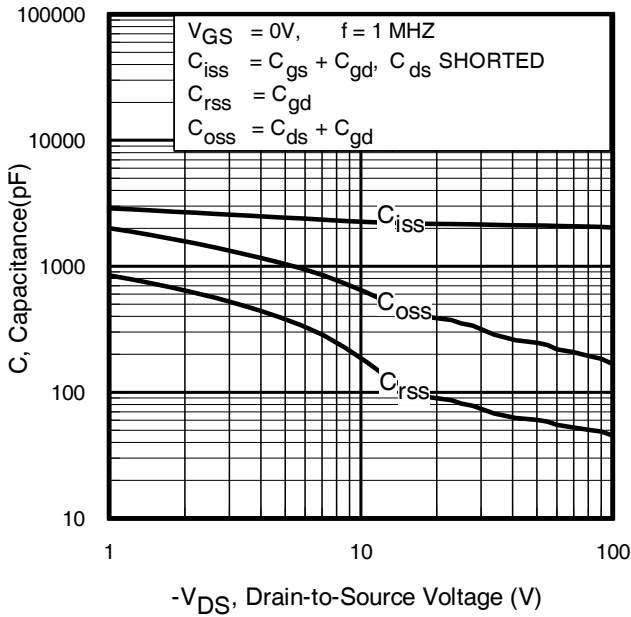
**Diode Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-27	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-110		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.6	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -16A, V <sub>GS</sub> = 0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	150	—	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -16A, V <sub>DD</sub> = -25V
Q <sub>rr</sub>	Reverse Recovery Charge	—	860	—	nC	di/dt = 100A/μs ④

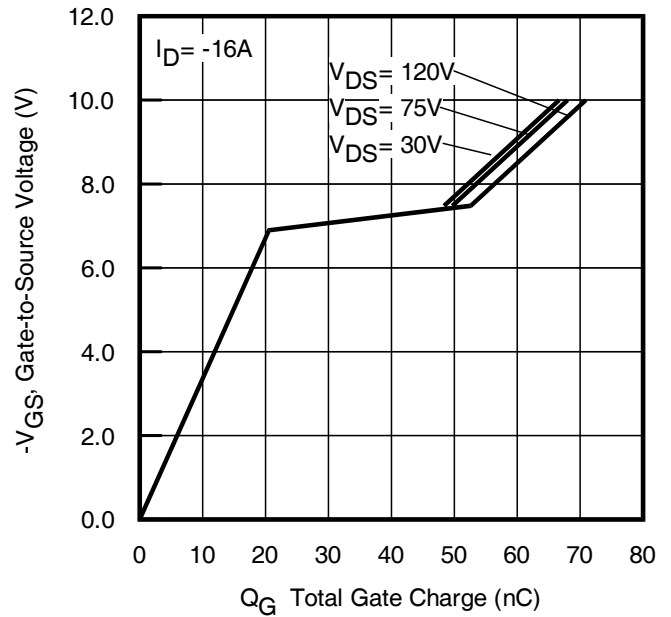
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② starting T<sub>J</sub> = 25°C, L = 1.6mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = -17A
- ③ I<sub>SD</sub> ≤ -17A, di/dt ≤ -520A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 175°C.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ R<sub>θ</sub> is measured at T<sub>J</sub> of approximately 90°C.
- ⑥ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

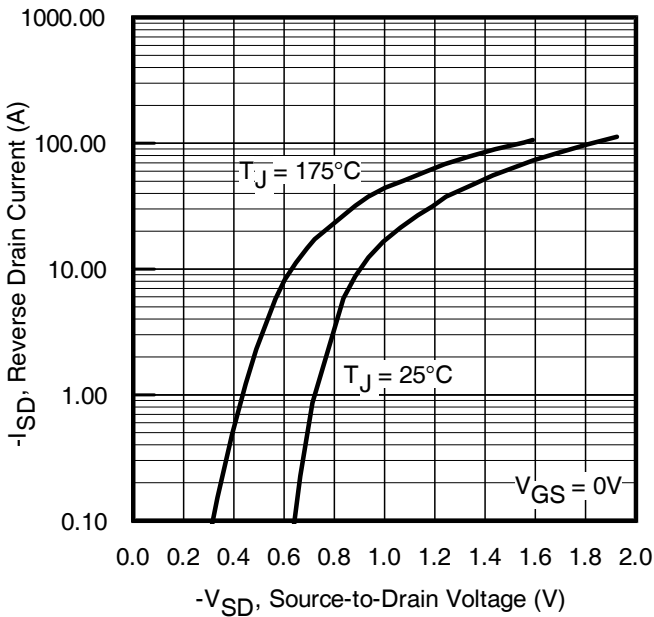

**Fig. 1** Typical Output Characteristics

**Fig. 2** Typical Output Characteristics

**Fig. 3** Typical Transfer Characteristics

**Fig. 4** Normalized On-Resistance vs. Temperature



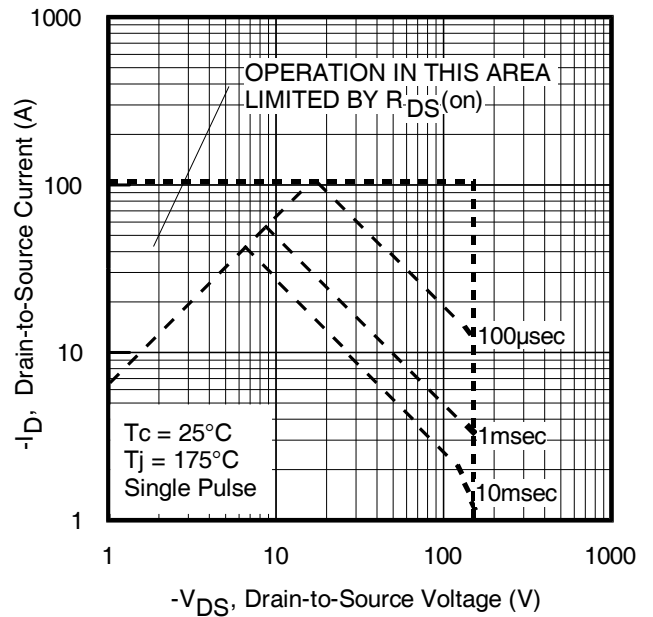
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



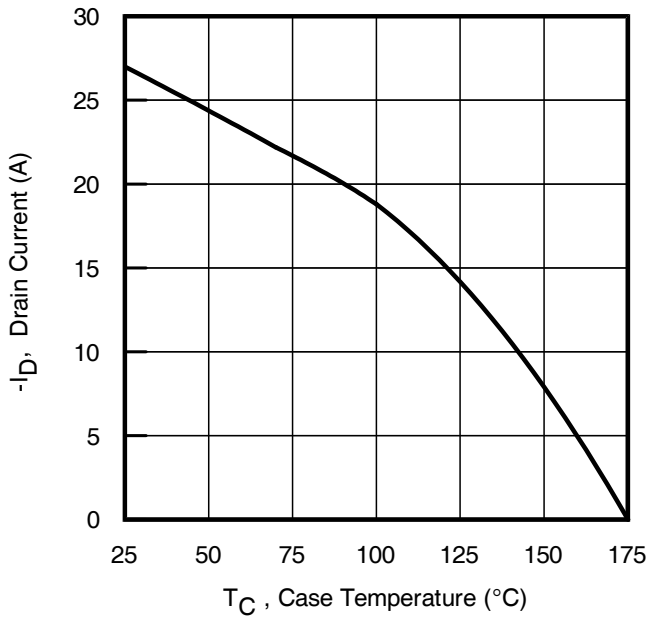
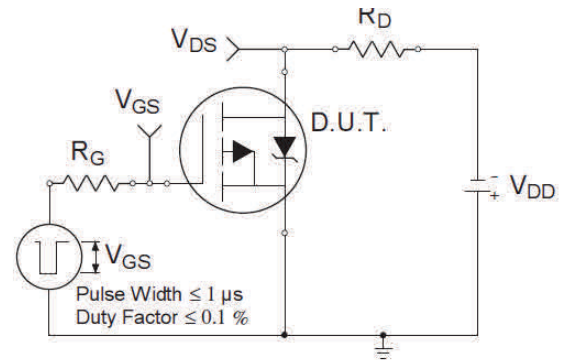
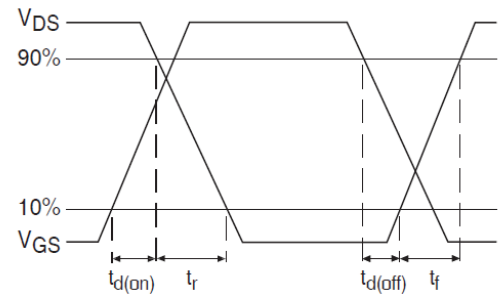
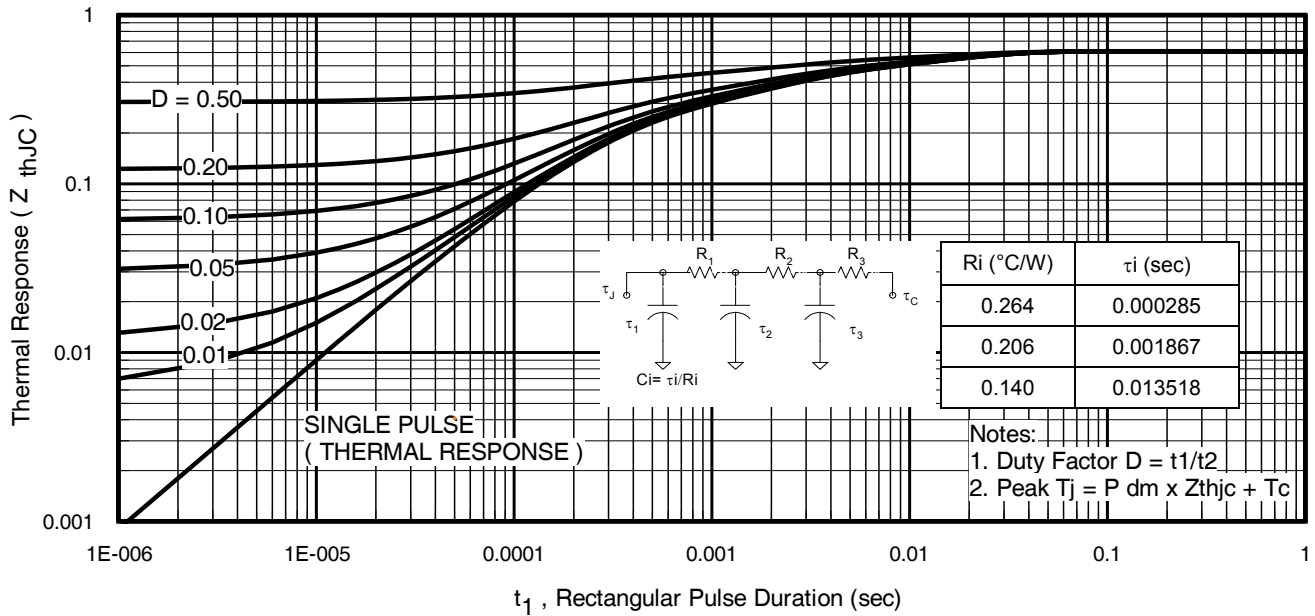
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage

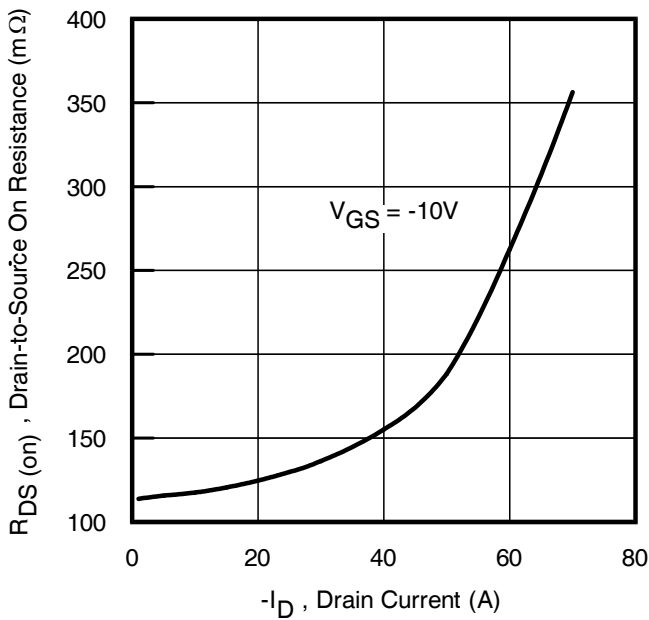
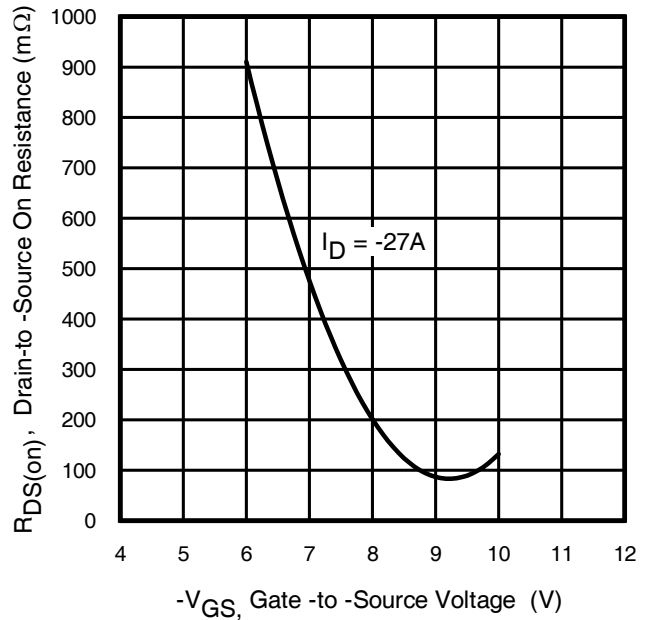
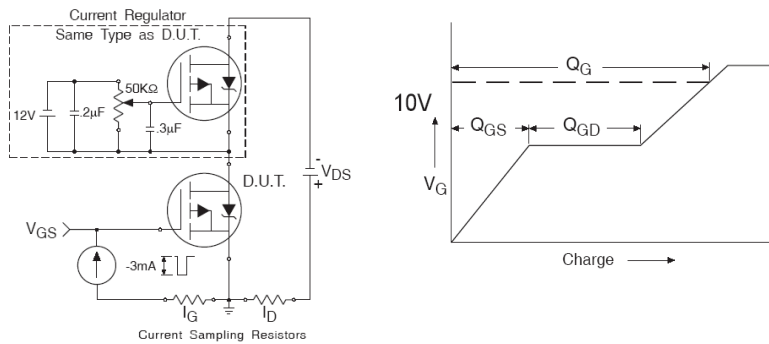
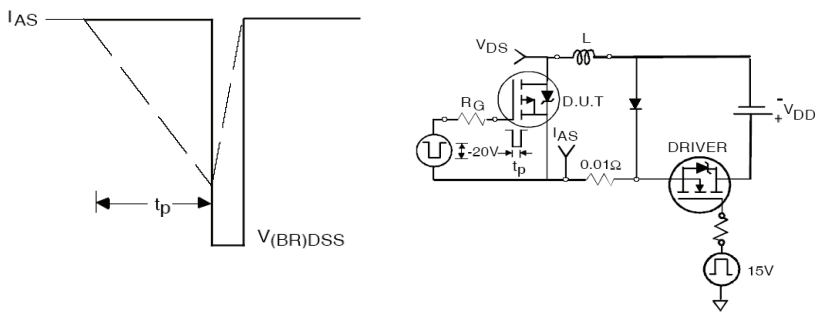
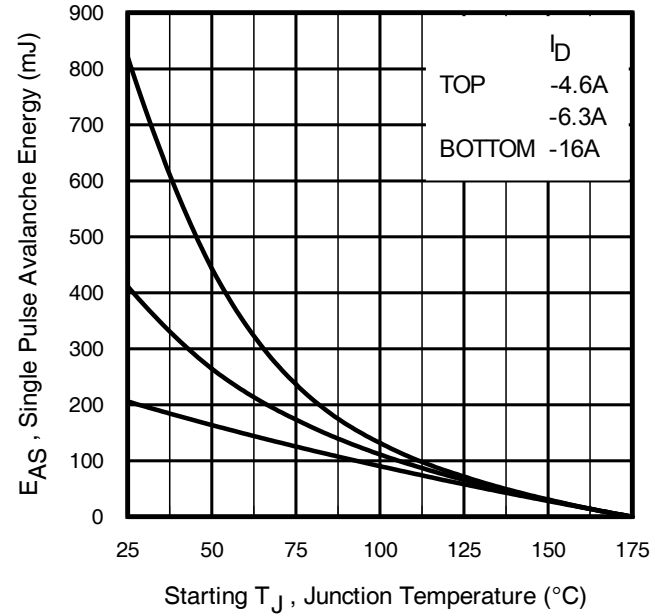


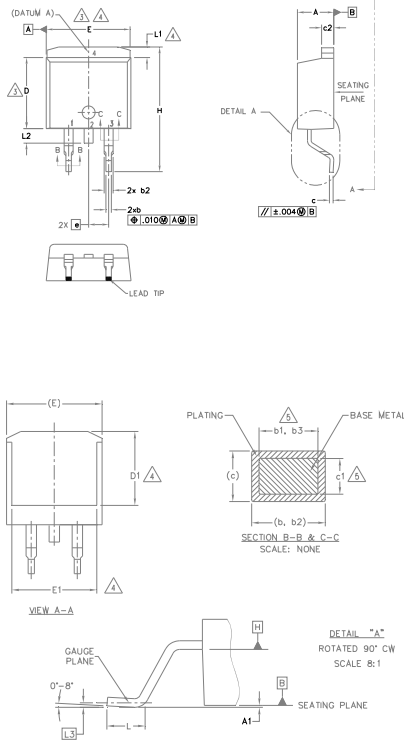
**Fig 7.** Typical Source-to-Drain Diode Forward Voltage



**Fig 8.** Maximum Safe Operating Area


**Fig 9.** Maximum Drain Current vs. Case Temperature

**Fig 10a.** Switching Time Test Circuit

**Fig 10b.** Switching Time Waveforms

**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case


**Fig 12. On-Resistance vs. Drain Current**

**Fig 13. On-Resistance vs. Gate Voltage**

**Fig 14a&b. Basic Gate Charge Test Circuit and Waveform**

**Fig 15a&b. Unclamped Inductive Test circuit and Waveforms**

**Fig 15c. Maximum Avalanche Energy vs. Drain Current**

**D2-Pak (TO-263AB) Package Outline (Dimensions are shown in millimeters (inches))**

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [".005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY AT DATUM H.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1, b3 AND c1 APPLY TO BASE METAL ONLY.
6. DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
7. CONTROLLING DIMENSION: INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-263AB.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	—	.270	—	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	—	.245	—	4
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1	—	1.68	—	.066	4
L2	—	1.78	—	.070	
L3	0.25 BSC		.010 BSC		

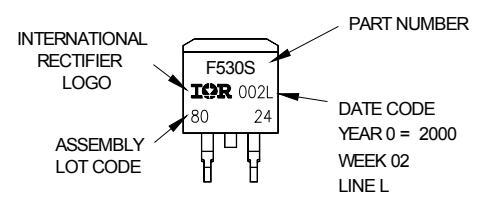
**LEAD ASSIGNMENTS**

- DIODES**
- 1.- ANODE (TWO DIE) / OPEN (ONE DIE)
  - 2, 4.- CATHODE
  - 3.- ANODE
- HEXFET**
- 1.- GATE
  - 2, 4.- DRAIN
  - 3.- SOURCE
- IGBTs, CoPACK**
- 1.- GATE
  - 2, 4.- COLLECTOR
  - 3.- EMITTER

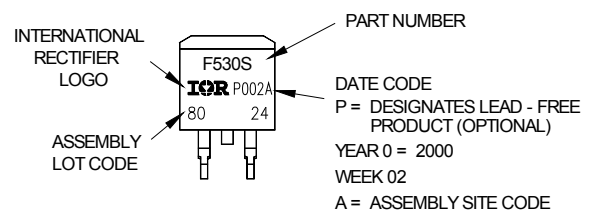
**D2-Pak (TO-263AB) Part Marking Information**

EXAMPLE: THIS IS AN IRF530S WITH  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000  
IN THE ASSEMBLY LINE "L"

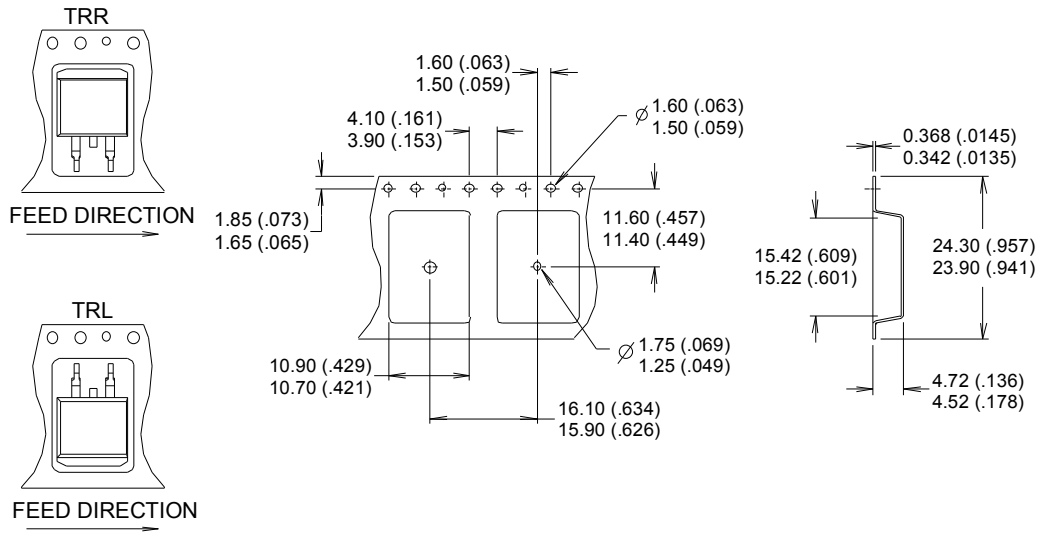
Note: "P" in assembly line position  
indicates "Lead - Free"



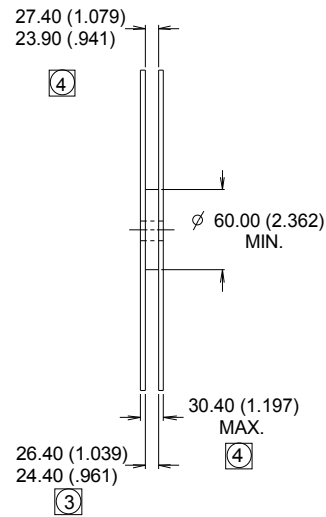
OR



Note: For the most current drawing please refer to Infineon's web site [www.infineon.com](http://www.infineon.com)

**D2-Pak (TO-263AB) Tape & Reel Information (Dimensions are shown in millimeters (inches))**

**NOTES :**

1. CONFORMS TO EIA-418.
2. CONTROLLING DIMENSION: MILLIMETER.
- ③ DIMENSION MEASURED @ HUB.
- ④ INCLUDES FLANGE DISTORTION @ OUTER EDGE.



Note: For the most current drawing please refer to Infineon's web site [www.infineon.com](http://www.infineon.com)



**Qualification Information†**

<b>Qualification Level</b>	Industrial (per JEDEC JESD47F) ††	
<b>Moisture Sensitivity Level</b>	D2-Pak	MSL1 (per JEDEC J-STD-020D) ††
<b>RoHS Compliant</b>	Yes	

† Qualification standards can be found at Infineon's web site [www.infineon.com](http://www.infineon.com)

†† Applicable version of JEDEC standard at the time of product release.

**Revision History**

Date	Comments
3/25/2015	<ul style="list-style-type: none"> <li>Updated datasheet based on IR corporate template.</li> <li>Updated package outline and part marking on page 7.</li> <li>Removed TO-262 Pak (IRF6218LPbF) from datasheet-all pages</li> </ul>
5/26/2016	<ul style="list-style-type: none"> <li>Updated datasheet with corporate template.</li> <li>Added disclaimer on last page.</li> </ul>

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**Document reference**

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