

International IR Rectifier

PD - 94508

IRF7490

HEXFET® Power MOSFET

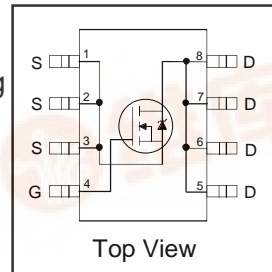
Applications

- High frequency DC-DC converters

V_{DS}	R_{DS(on)} max	Q_g
100V	39mΩ@V_{GS}=10V	37nC

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



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V _{DS}	Drain-Source Voltage	100	V
V _{GS}	Gate-to-Source Voltage	± 20	
I _D @ T _A = 25°C	Continuous Drain Current, V _{GS} @ 10V	5.4	A
I _D @ T _A = 70°C	Continuous Drain Current, V _{GS} @ 10V	4.3	
I _{DM}	Pulsed Drain Current	43	
P _D @ T _A = 25°C	Maximum Power Dissipation	2.5	W
P _D @ T _A = 70°C	Maximum Power Dissipation	1.6	
	Linear Derating Factor	20	mW/°C
T _J	Operating Junction and	-55 to + 150	°C
T _{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
R _{θJL}	Junction-to-Drain Lead	—	20	°C/W
R _{θJA}	Junction-to-Ambient ④	—	50	

Notes ① through ④ are on page 9
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Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.11	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ ③
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	33	39	mΩ	$V_{GS} = 10V, I_D = 3.2A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -20V$

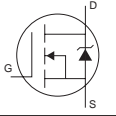
Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	8.0	—	—	S	$V_{DS} = 50V, I_D = 3.2A$
Q_g	Total Gate Charge	—	37	56	nC	$I_D = 3.2A$ $V_{DS} = 50V$ $V_{GS} = 10V,$
Q_{gs}	Gate-to-Source Charge	—	8.0	—		
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	10	—	ns	$V_{DD} = 100V$ $I_D = 3.2A$ $R_G = 9.1\Omega$ $V_{GS} = 10V$ ③
$t_{d(on)}$	Turn-On Delay Time	—	13	—		
t_r	Rise Time	—	4.2	—		
$t_{d(off)}$	Turn-Off Delay Time	—	51	—		
t_f	Fall Time	—	11	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0\text{MHz}$ $V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0\text{MHz}$ $V_{GS} = 0V, V_{DS} = 80V, f = 1.0\text{MHz}$ $V_{GS} = 0V, V_{DS} = 0V \text{ to } 80V$ ⑤
C_{iss}	Input Capacitance	—	1720	—		
C_{oss}	Output Capacitance	—	220	—		
C_{rss}	Reverse Transfer Capacitance	—	25	—		
C_{oss}	Output Capacitance	—	1650	—		
C_{oss}	Output Capacitance	—	130	—		
$C_{oss \text{ eff.}}$	Effective Output Capacitance	—	250	—		

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	91	mJ
I_{AR}	Avalanche Current ①	—	3.2	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	43		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 3.2A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	67	100	ns	$T_J = 25^\circ\text{C}, I_F = 3.2A$
Q_{rr}	Reverse Recovery Charge	—	220	330	nC	$di/dt = 100A/\mu s$ ③

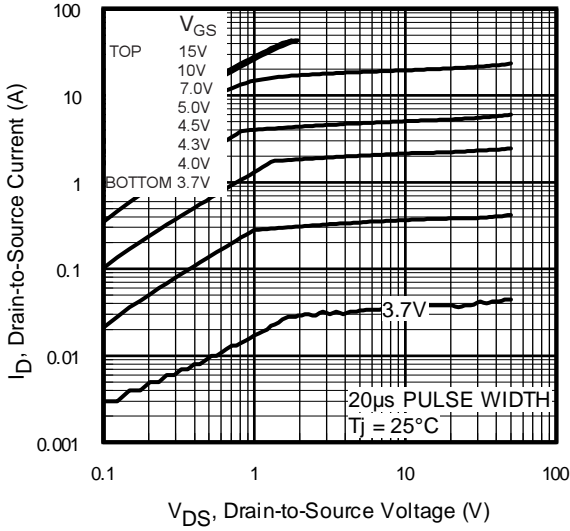


Fig 1. Typical Output Characteristics

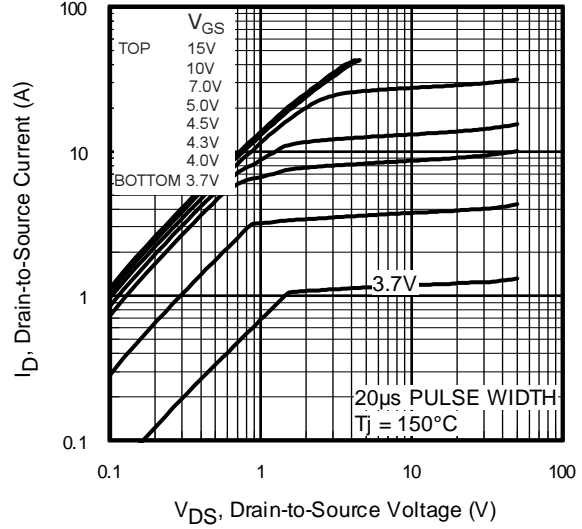


Fig 2. Typical Output Characteristics

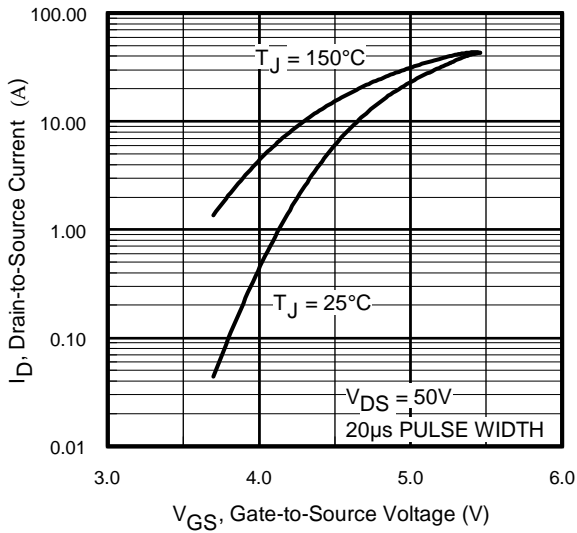


Fig 3. Typical Transfer Characteristics

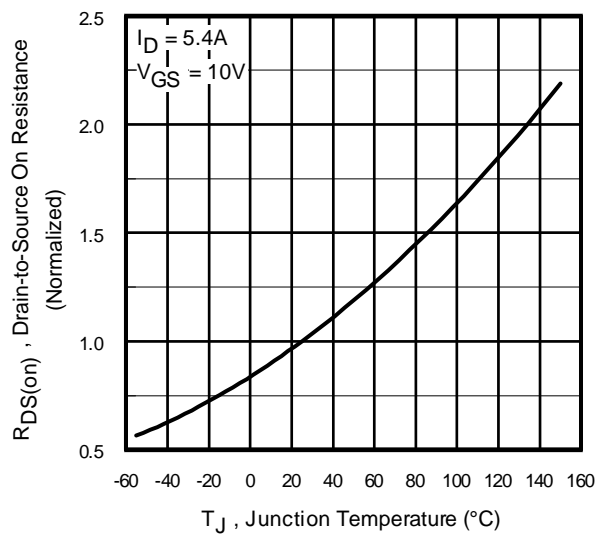


Fig 4. Normalized On-Resistance Vs. Temperature

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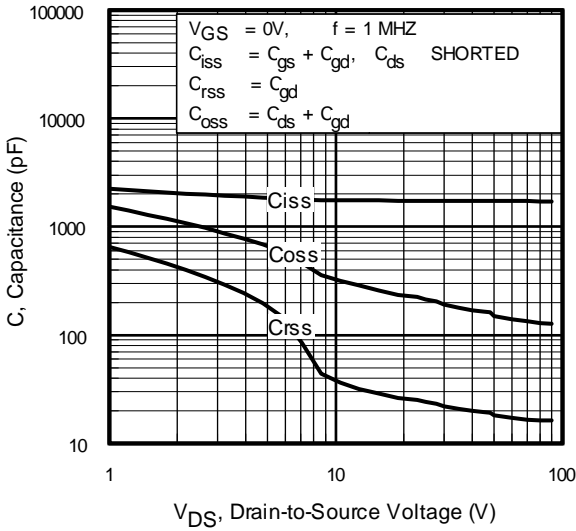


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

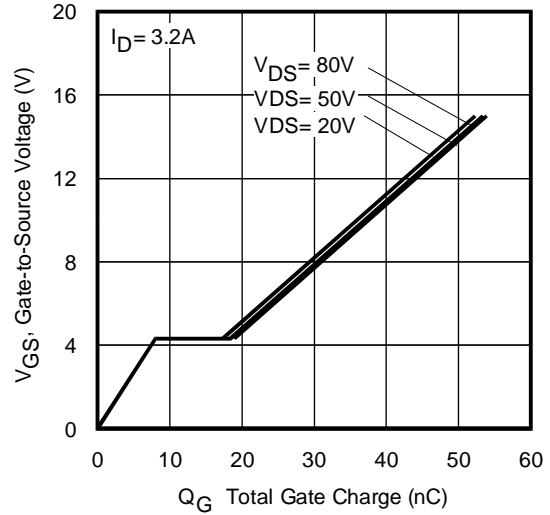


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

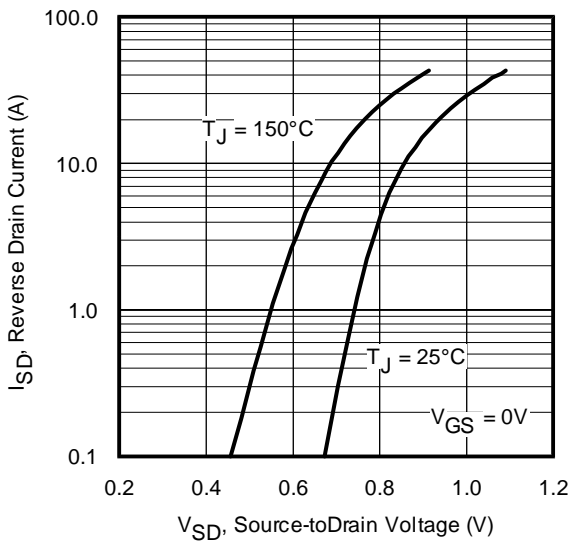


Fig 7. Typical Source-Drain Diode Forward Voltage

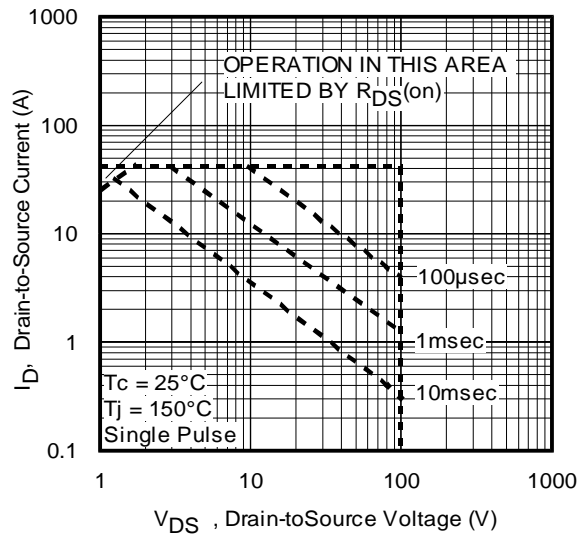


Fig 8. Maximum Safe Operating Area

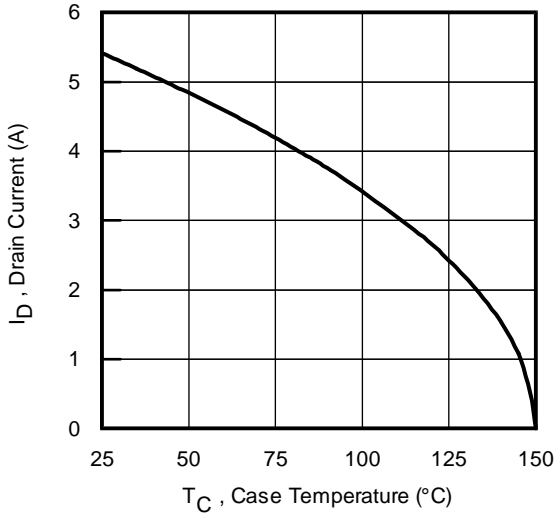


Fig 9. Maximum Drain Current Vs. Ambient Temperature

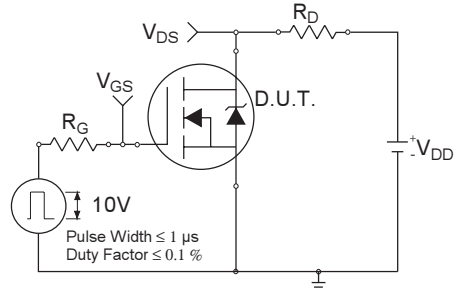


Fig 10a. Switching Time Test Circuit

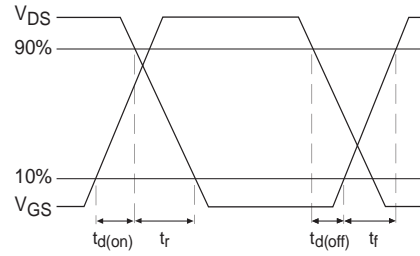


Fig 10b. Switching Time Waveforms

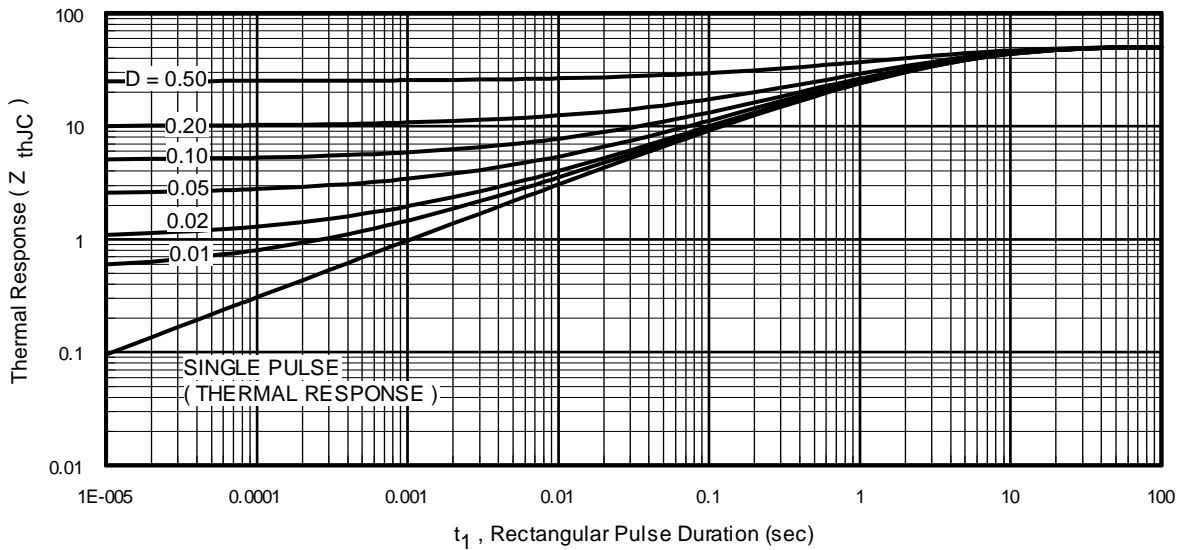


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

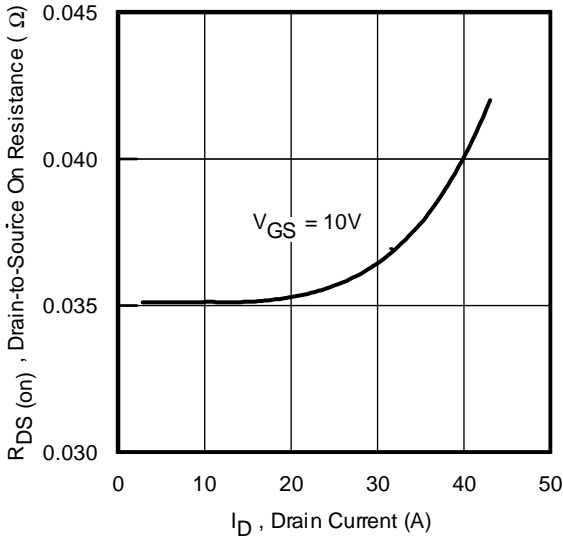


Fig 12. On-Resistance Vs. Drain Current

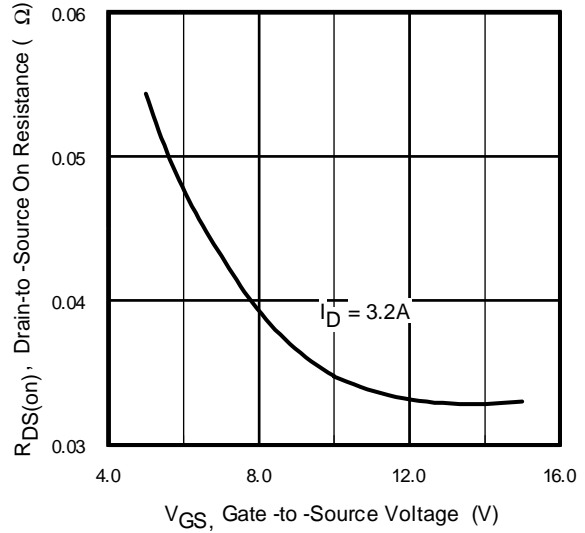


Fig 13. On-Resistance Vs. Gate Voltage

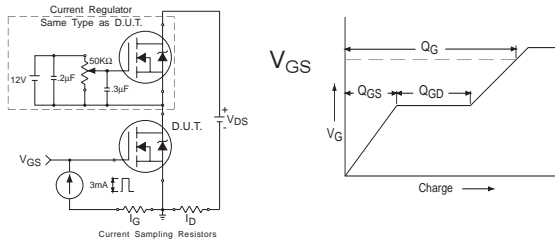


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform

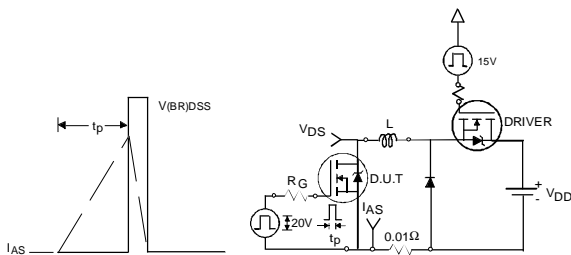


Fig 15a&b. Unclamped Inductive Test circuit and Waveforms

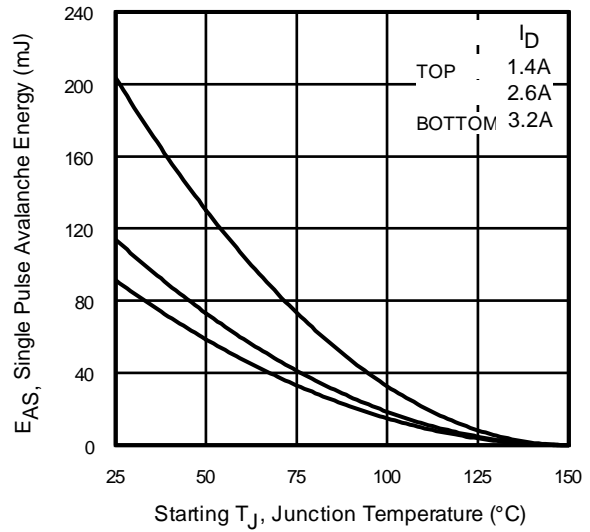


Fig 15c. Maximum Avalanche Energy Vs. Drain Current

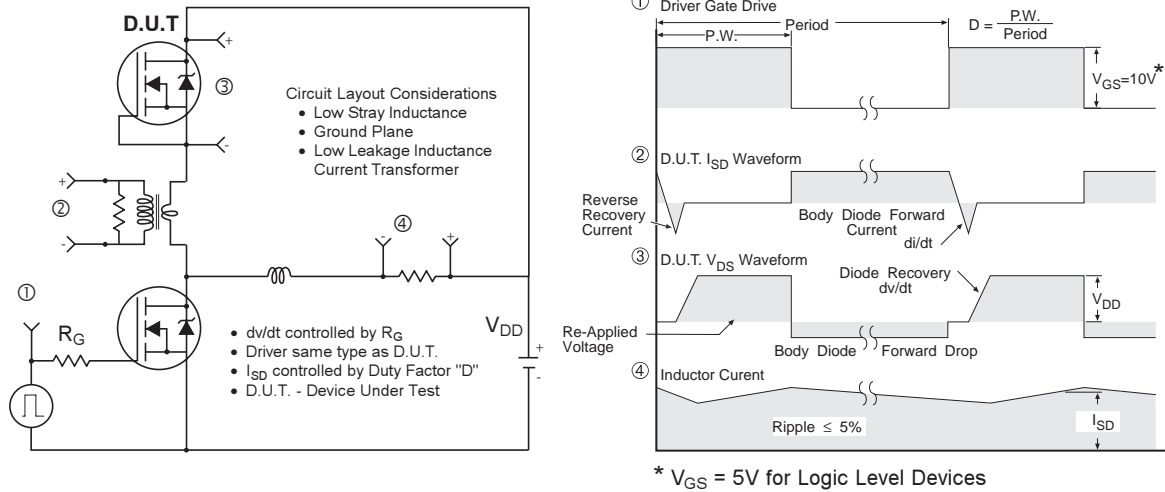


Fig 16. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

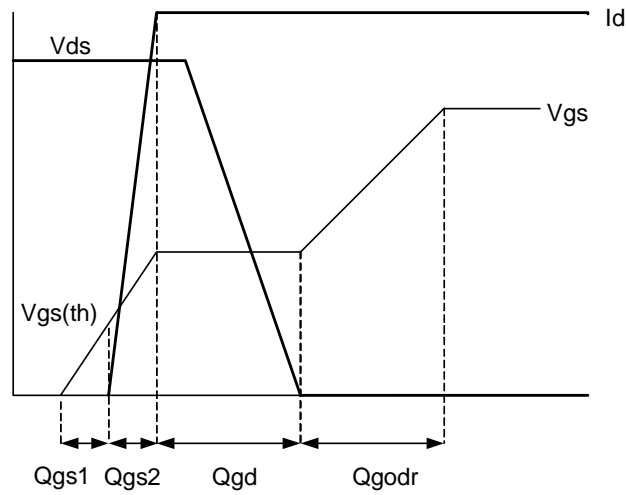
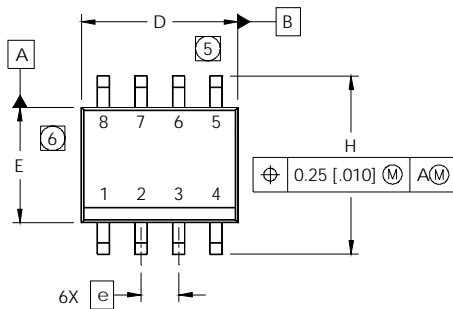


Fig 17. Gate Charge Waveform

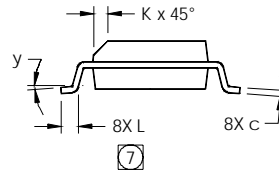
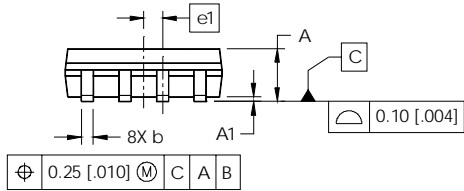
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SO-8 Package Details



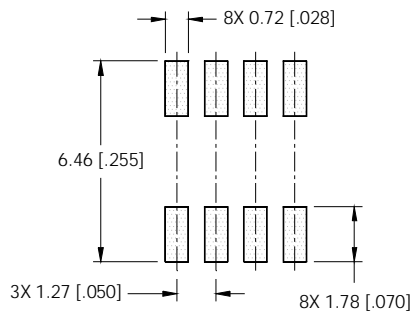
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°



NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO ASUBSTRATE.

FOOTPRINT



SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

