

IRF7105

International
Rectifier

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

	Parameter		Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	N-Ch	25	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
		P-Ch	-25	—	—		$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	N-Ch	—	0.030	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
		P-Ch	—	-0.015	—		Reference to 25°C , $I_D = -1\text{mA}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	N-Ch	—	0.083	0.10	Ω	$V_{GS} = 10V, I_D = 1.0A$ ③
			—	0.14	0.16		$V_{GS} = 4.5V, I_D = 0.50A$ ③
		P-Ch	—	0.16	0.25		$V_{GS} = -10V, I_D = -1.0A$ ③
			—	0.30	0.40		$V_{GS} = -4.5V, I_D = -0.50A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	N-Ch	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		P-Ch	-1.0	—	-3.0		$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance	N-Ch	—	4.3	—	S	$V_{DS} = 15V, I_D = 3.5A$ ③
		P-Ch	—	3.1	—		$V_{DS} = -15V, I_D = -3.5A$ ③
I_{DSS}	Drain-to-Source Leakage Current	N-Ch	—	—	2.0	μA	$V_{DS} = 20V, V_{GS} = 0V$
		P-Ch	—	—	-2.0		$V_{DS} = -20V, V_{GS} = 0V$
		N-Ch	—	—	25		$V_{DS} = 20V, V_{GS} = 0V, T_J = 55^\circ\text{C}$
		P-Ch	—	—	-25		$V_{DS} = -20V, V_{GS} = 0V, T_J = 55^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	N-P	—	—	± 100		$V_{GS} = \pm 20V$
Q_g	Total Gate Charge	N-Ch	—	9.4	27	nC	N-Channel $I_D = 2.3A, V_{DS} = 12.5V, V_{GS} = 10V$ ③
		P-Ch	—	10	25		
Q_{gs}	Gate-to-Source Charge	N-Ch	—	1.7	—		
		P-Ch	—	1.9	—		
Q_{gd}	Gate-to-Drain ("Miller") Charge	N-Ch	—	3.1	—	nC	P-Channel $I_D = -2.3A, V_{DS} = -12.5V, V_{GS} = -10V$
		P-Ch	—	2.8	—		
$t_{d(on)}$	Turn-On Delay Time	N-Ch	—	7.0	20	ns	N-Channel $V_{DD} = 25V, I_D = 1.0A, R_G = 6.0\Omega, R_D = 25\Omega$ ③
		P-Ch	—	12	40		
t_r	Rise Time	N-Ch	—	9.0	20		
		P-Ch	—	13	40		
$t_{d(off)}$	Turn-Off Delay Time	N-Ch	—	45	90	ns	P-Channel $V_{DD} = -25V, I_D = -1.0A, R_G = 6.0\Omega, R_D = 25\Omega$ ③
		P-Ch	—	45	90		
t_f	Fall Time	N-Ch	—	25	50	ns	
		P-Ch	—	37	50		
L_D	Internal Drain Inductance	N-P	—	4.0	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	N-P	—	6.0	—		
C_{iss}	Input Capacitance	N-Ch	—	330	—	pF	N-Channel $V_{GS} = 0V, V_{DS} = 15V, f = 1.0\text{MHz}$
		P-Ch	—	290	—		
C_{oss}	Output Capacitance	N-Ch	—	250	—		
		P-Ch	—	210	—		
C_{rss}	Reverse Transfer Capacitance	N-Ch	—	61	—	pF	P-Channel $V_{GS} = 0V, V_{DS} = -15V, f = 1.0\text{MHz}$
		P-Ch	—	67	—		

Source-Drain Ratings and Characteristics

	Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	N-Ch	—	—	2.0	A	
		P-Ch	—	—	-2.0		
I_{SM}	Pulsed Source Current (Body Diode) ①	N-Ch	—	—	14		
		P-Ch	—	—	-9.2		
V_{SD}	Diode Forward Voltage	N-Ch	—	—	1.2	V	$T_J = 25^{\circ}\text{C}$, $I_S = 1.3\text{A}$, $V_{GS} = 0\text{V}$ ③
		P-Ch	—	—	-1.2		$T_J = 25^{\circ}\text{C}$, $I_S = -1.3\text{A}$, $V_{GS} = 0\text{V}$ ③
t_{rr}	Reverse Recovery Time	N-Ch	—	36	54	ns	N-Channel $T_J = 25^{\circ}\text{C}$, $I_F = 1.3\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
		P-Ch	—	69	100		
Q_{rr}	Reverse Recovery Charge	N-Ch	—	41	75	nC	P-Channel $T_J = 25^{\circ}\text{C}$, $I_F = -1.3\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ ③
		P-Ch	—	90	180		
t_{on}	Forward Turn-On Time	N-P	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② N-Channel $I_{SD} \leq 3.5A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
P-Channel $I_{SD} \leq -2.3A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ④ Surface mounted on FR-4 board, $t \leq 10\text{sec}$.

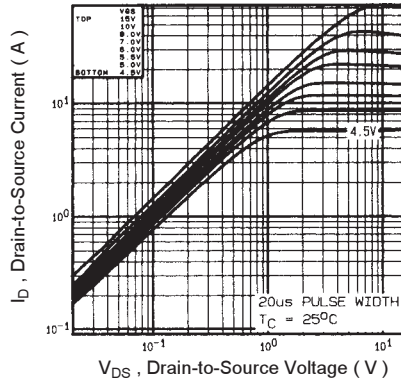


Fig 1. Typical Output Characteristics

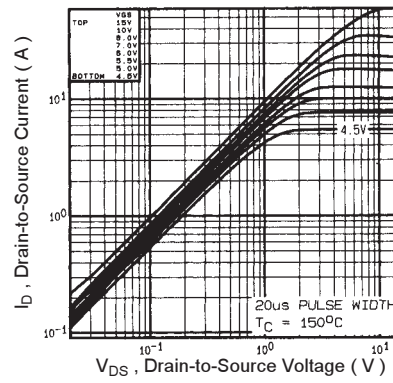


Fig 2. Typical Output Characteristics

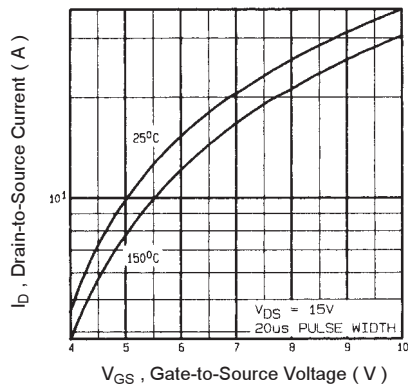


Fig 3. Typical Transfer Characteristics

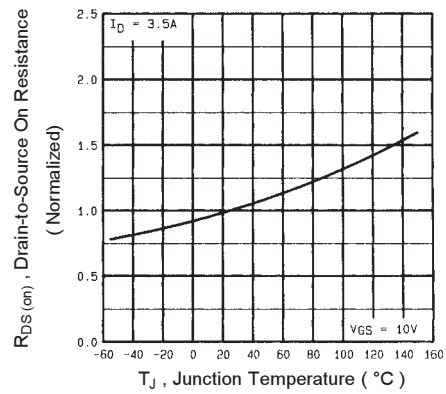


Fig 4. Normalized On-Resistance Vs. Temperature

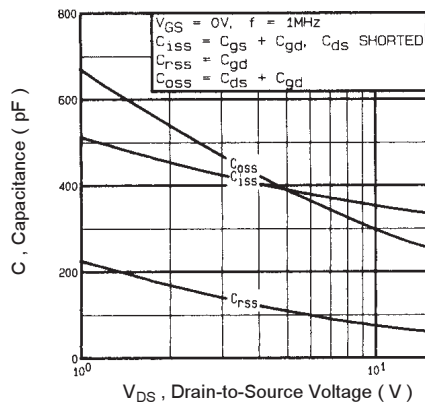


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

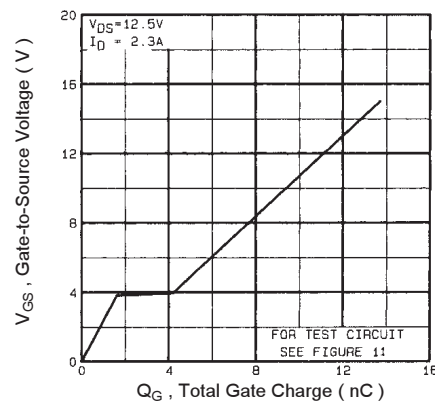


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

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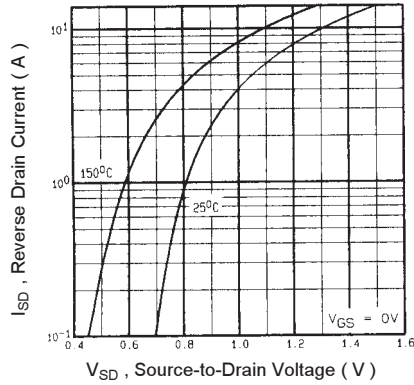


Fig 7. Typical Source-Drain Diode Forward Voltage

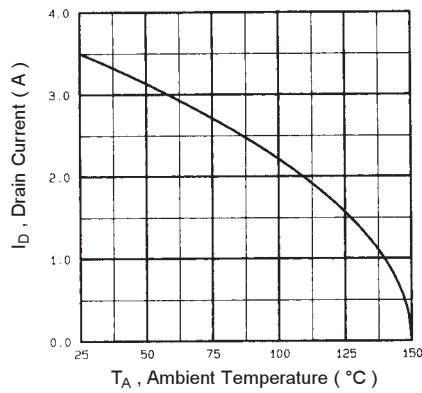


Fig 9. Maximum Drain Current Vs. Ambient Temperature

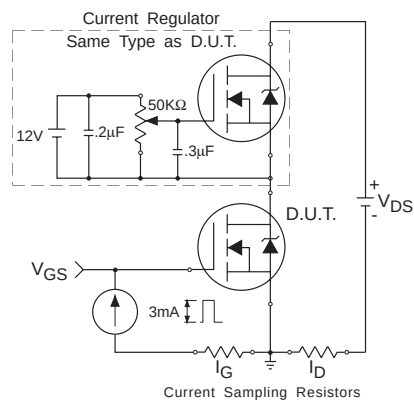


Fig 11a. Gate Charge Test Circuit

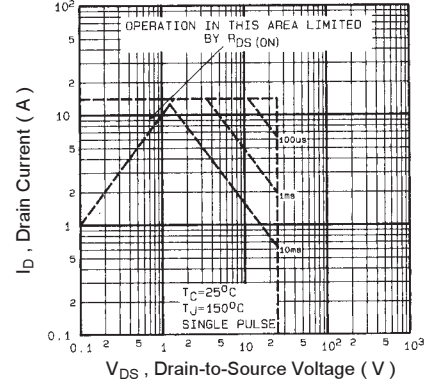


Fig 8. Maximum Safe Operating Area

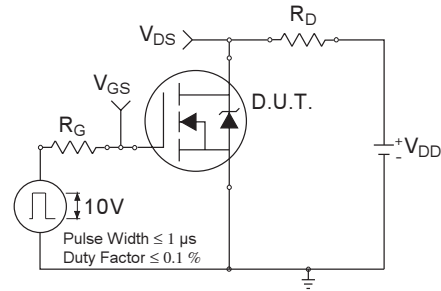


Fig 10a. Switching Time Test Circuit

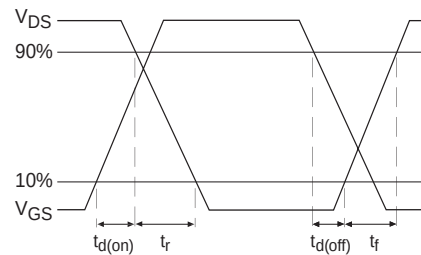


Fig 10b. Switching Time Waveforms

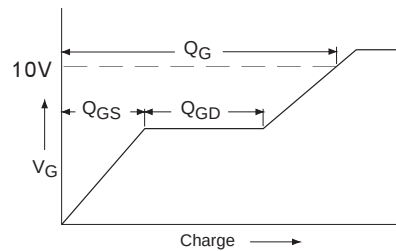


Fig 11b. Basic Gate Charge Waveform

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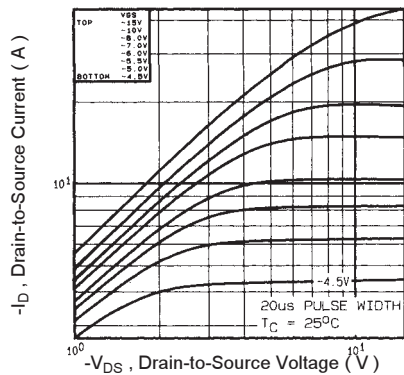


Fig 12. Typical Output Characteristics

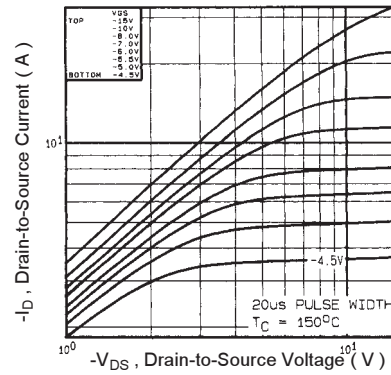


Fig 13. Typical Output Characteristics

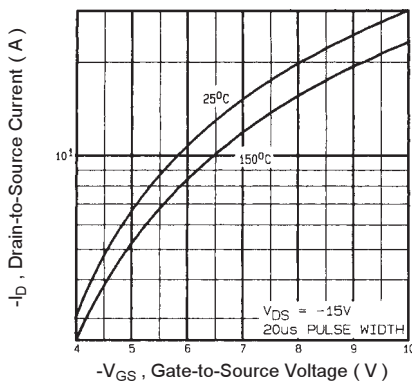


Fig 14. Typical Transfer Characteristics

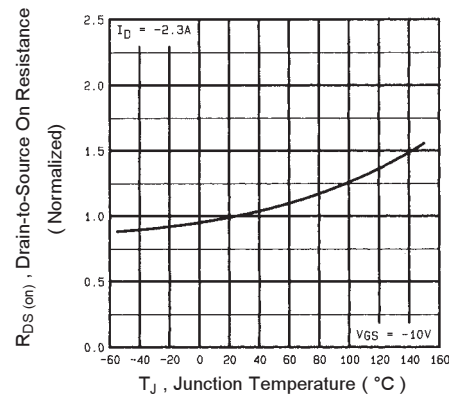


Fig 15. Normalized On-Resistance Vs. Temperature

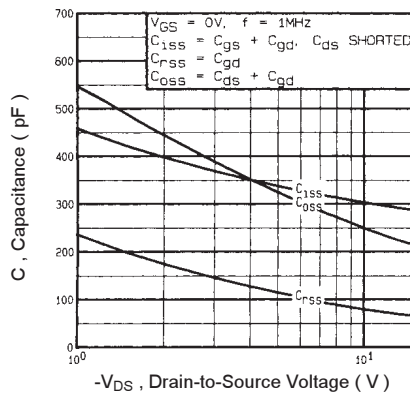


Fig 16. Typical Capacitance Vs. Drain-to-Source Voltage

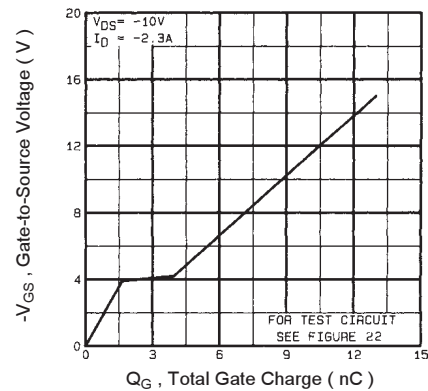


Fig 17. Typical Gate Charge Vs. Gate-to-Source Voltage

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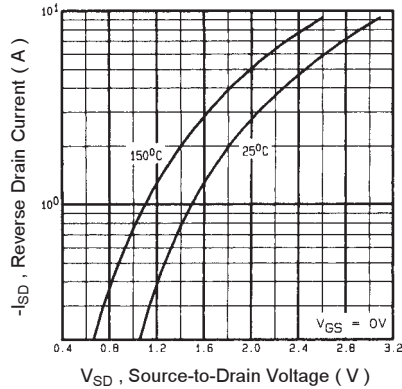


Fig 18. Typical Source-Drain Diode Forward Voltage

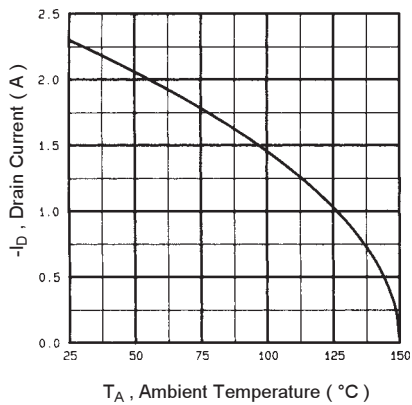


Fig 20. Maximum Drain Current Vs. Ambient Temperature

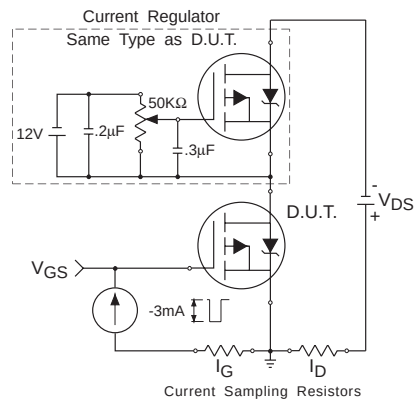


Fig 22a. Gate Charge Test Circuit

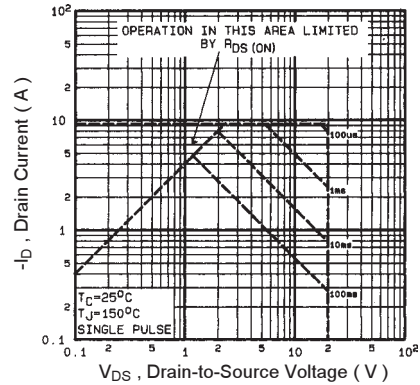


Fig 19. Maximum Safe Operating Area

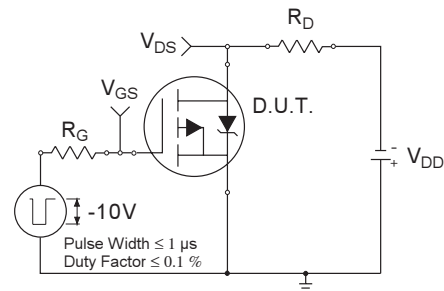


Fig 21a. Switching Time Test Circuit

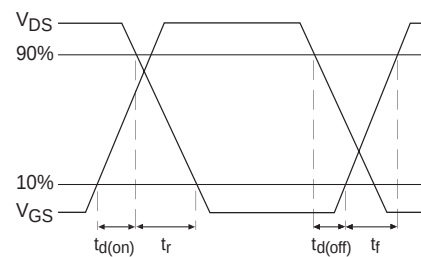


Fig 21b. Switching Time Waveforms

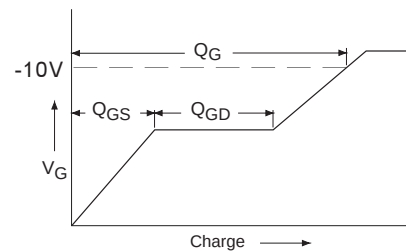


Fig 22b. Basic Gate Charge Waveform

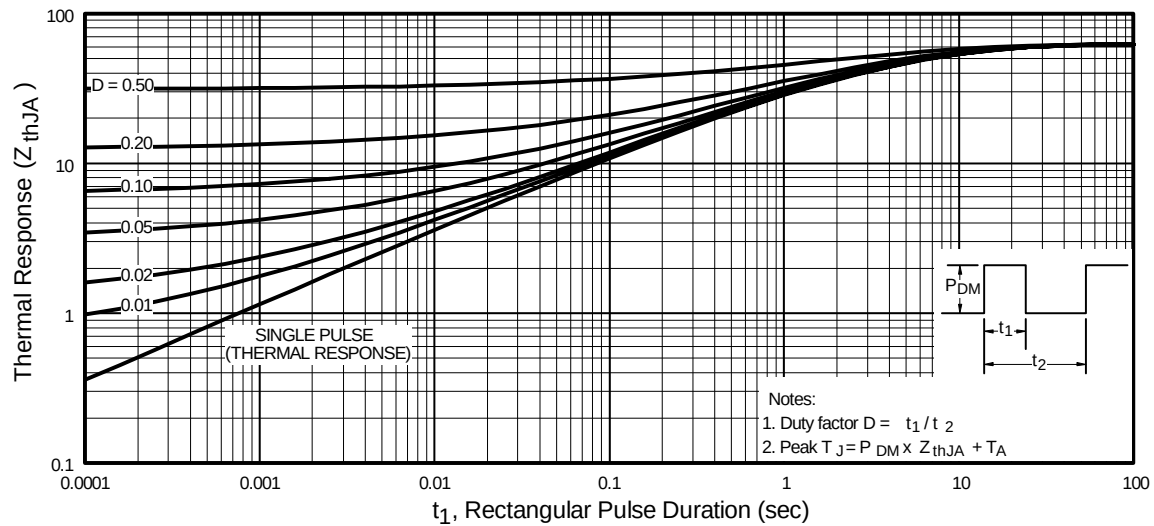
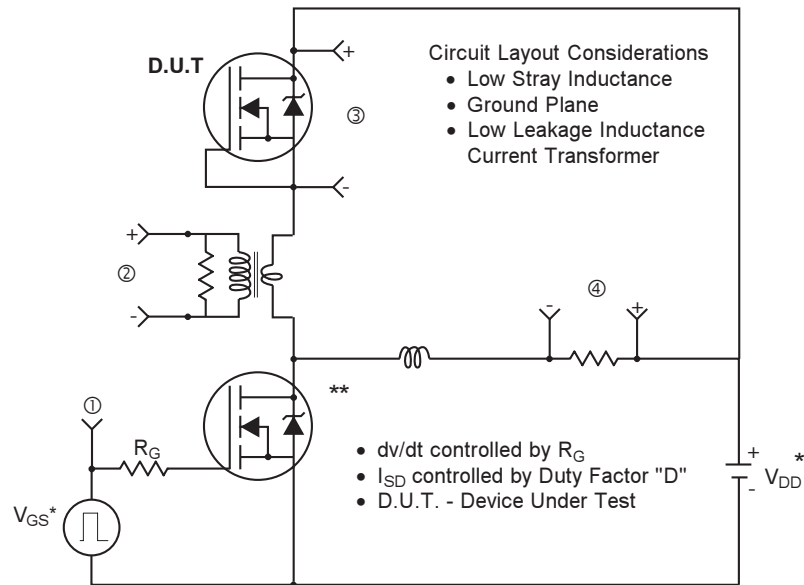


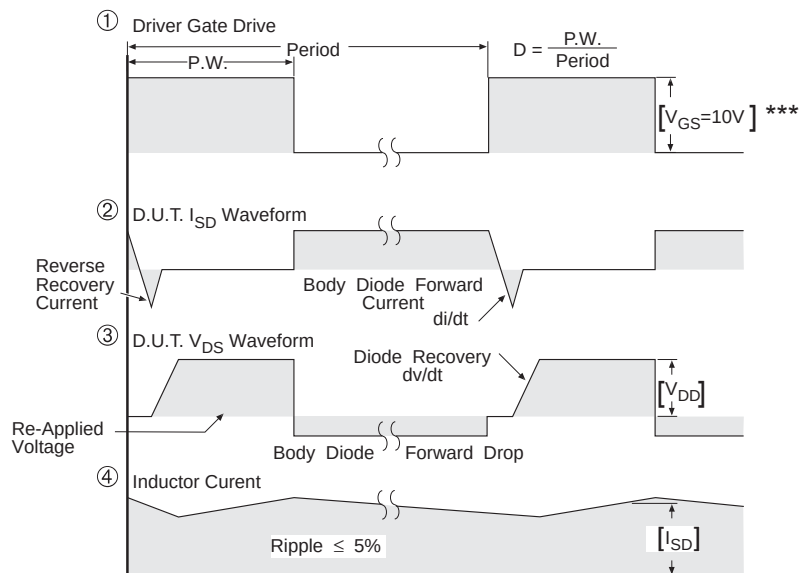
Fig 23. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Peak Diode Recovery dv/dt Test Circuit



* Reverse Polarity for P-Channel

** Use P-Channel Driver for P-Channel Measurements

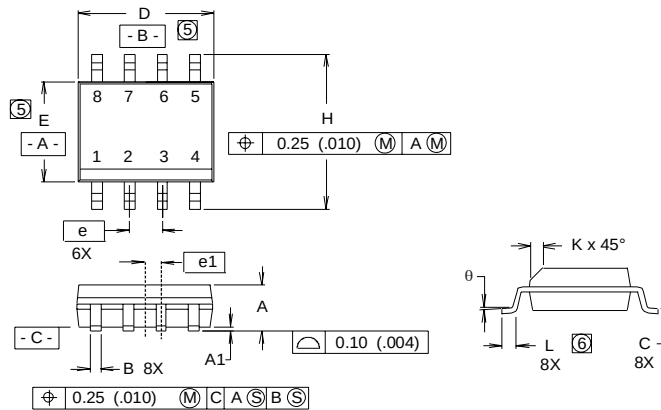


*** $V_{GS} = 5.0V$ for Logic Level and 3V Drive Devices

Fig 24. For N and P Channel HEXFETS

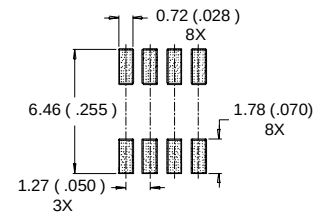
SO-8 Package Details

Dimensions are shown in millimeters (inches)



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	0.16	.050	0.41	1.27
θ	0°	8°	0°	8°

RECOMMENDED FOOTPRINT

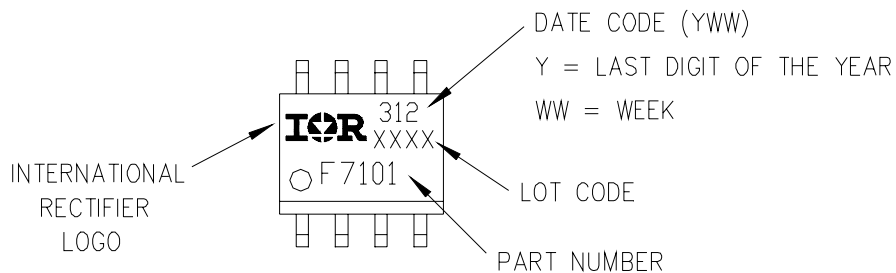


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
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 0.25 (.006).
6. DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101

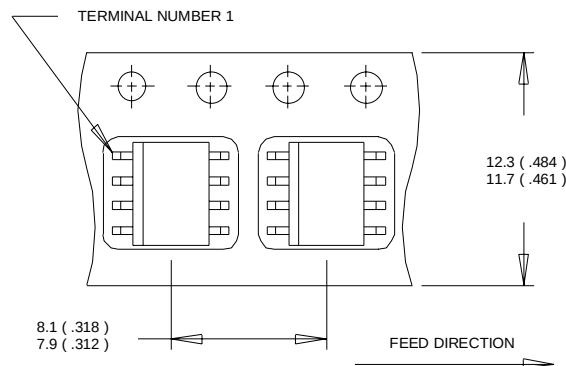


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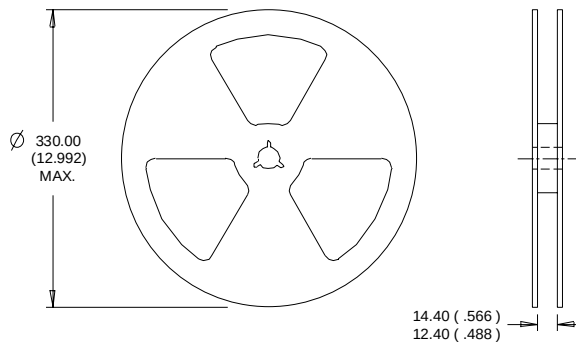
SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



NOTES:

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Industrial market.
Qualification Standards can be found on IR's Web site.

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