

IRF3CMS17N80

POWER MOSFET THRU-HOLE (Low-Ohmic TO-254AA)

800V, N-CHANNEL

Product Summary

Part Number	RDS(on)	I _D
IRF3CMS17N80	0.34Ω	15A



Description

The MOSFET uses Infineon 800V C3 CoolMOS™ advanced technology to deliver high performance with low RDS(on) and fast switching in a low ohmic hermetic package. The 800V C3 CoolMOS™ technology uses proven Super Junction design and is implemented with ease of use in mind.

Features

- New Revolutionary High Voltage Technology
- Extreme dv/dt Rated
- High Peak Current Capability
- Ultra Low Gate Charge
- Ultra Low Effective Capacitance
- Ceramic Eyelets
- Electrically Isolated
- Light Weight
- ESD Rating: Class 3A per MIL-STD-750, Method 1020

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I _{D1} @ V _{GS} = 10V, T _C = 25°C	Continuous Drain Current	15	A
I _{D2} @ V _{GS} = 10V, T _C = 100°C	Continuous Drain Current	10	
I _{DM} @ T _C = 25°C	Pulsed Drain Current ①	60	
P _D @ T _C = 25°C	Maximum Power Dissipation	200	W
	Linear Derating Factor	1.6	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
E _{AS}	Single Pulse Avalanche Energy ②	196	mJ
I _{AR}	Avalanche Current ①	15	A
E _{AR}	Repetitive Avalanche Energy ①	20	mJ
dv/dt	Peak Diode Recovery ③	14	V/ns
T _J T _{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Lead Temperature	300 (0.063 in. /1.6 mm from case for 10s)	
	Weight	9.3 (Typical)	

For footnotes refer to the page 2.

Electrical Characteristics @ T_j = 25°C (Unless Otherwise Specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	800	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.87	—	V/°C	Reference to 25°C, I _D = 1.0mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	0.34	Ω	V _{GS} = 10V, I _{D2} = 10A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Coefficient	—	-7.6	—	mV/°C	
G _{fs}	Forward Transconductance	9.3	—	—	S	V _{DS} = 15V, I _{D2} = 10A ④
I _{DSS}	Zero Gate Voltage Drain Current	—	—	10	μA	V _{DS} = 800V, V _{GS} = 0V
		—	—	25		V _{DS} = 800V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Leakage Forward	—	—	100	nA	V _{GS} = 20V
	Gate-to-Source Leakage Reverse	—	—	-100		V _{GS} = -20V
Q _G	Total Gate Charge	—	—	135	nC	I _{D1} = 15A
Q _{GS}	Gate-to-Source Charge	—	—	20		V _{DS} = 400V
Q _{GD}	Gate-to-Drain ('Miller') Charge	—	—	60		V _{GS} = 10V
t _{d(on)}	Turn-On Delay Time	—	—	18	ns	V _{DD} = 400V
t _r	Rise Time	—	—	26		I _{D1} = 15A
t _{d(off)}	Turn-Off Delay Time	—	—	83		R _G = 2.4Ω
t _f	Fall Time	—	—	23		V _{GS} = 10V
L _S + L _D	Total Inductance	—	6.8	—	nH	Measured from Drain lead (6mm / 0.25 in from package) to Source lead (6mm/ 0.25 in from package)
C _{iss}	Input Capacitance	—	2300	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	100	—		V _{DS} = 100V
C _{rss}	Reverse Transfer Capacitance	—	3.3	—		f = 1.0MHz
R _G	Gate Resistance	—	1.0	—	Ω	f = 1.0MHz, open drain

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	15	A	
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	60		
V _{SD}	Diode Forward Voltage	—	—	1.2	V	T _J = 25°C, I _S = 15A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	—	990	ns	T _J = 25°C, I _F = 15A, V _{DD} ≤ 50V
Q _{rr}	Reverse Recovery Charge	—	—	24	μC	di/dt = 100A/μs ④
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D)				

Thermal Resistance

Symbol	Parameter	Min.	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	—	—	0.63	°C/W
R _{θJA}	Junction-to-Ambient (Typical Socket Mount)	—	—	48	

Footnotes:

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
- ② V_{DD} = 150V, starting T_J = 25°C, L = 1.7mH, Peak I_L = 15A, R_G = 25Ω, V_{GS} = 20V.
- ③ I_{SD} ≤ 15A, di/dt ≤ 2060A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 150°C.
- ④ Pulse width ≤ 300 μs; Duty Cycle ≤ 2%

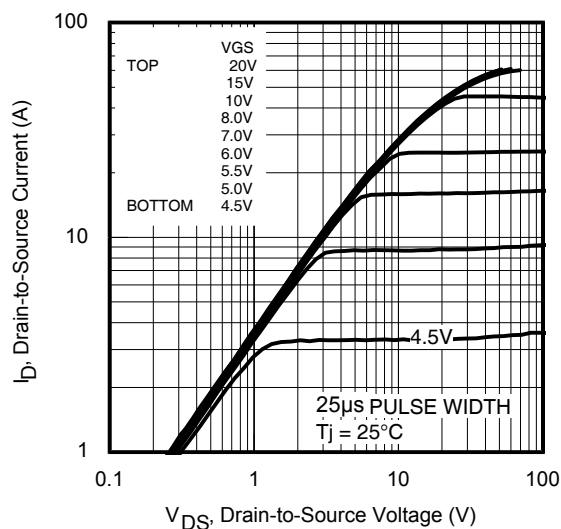


Fig 1. Typical Output Characteristics

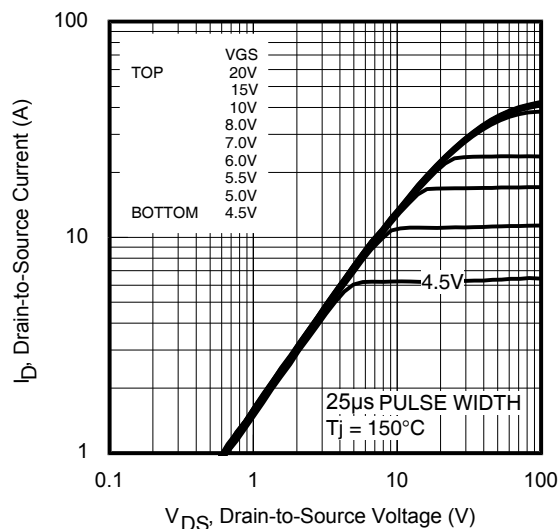


Fig 2. Typical Output Characteristics

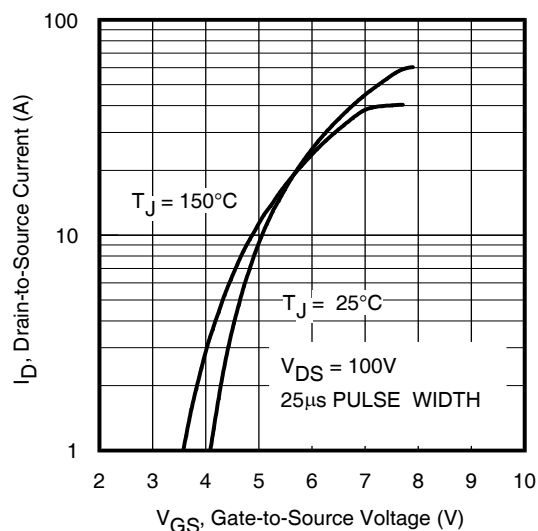


Fig 3. Typical Transfer Characteristics

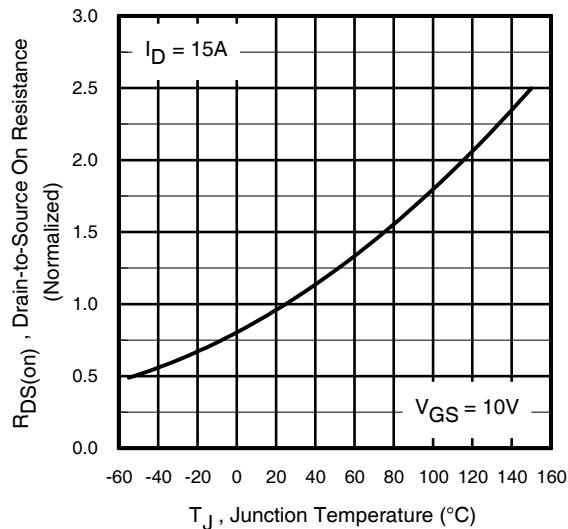


Fig 4. Normalized On-Resistance Vs. Temperature

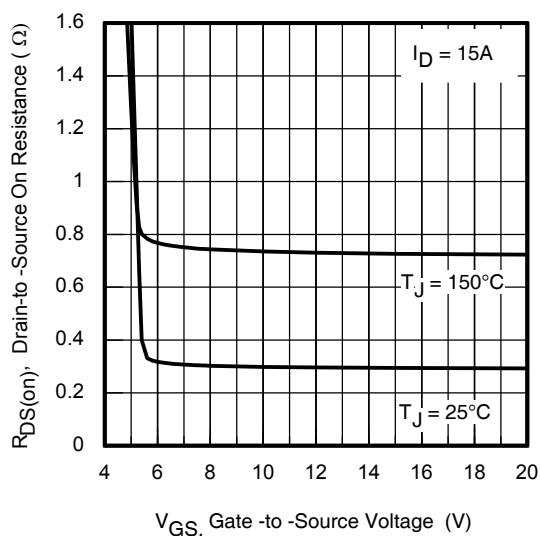


Fig 5. Typical On-Resistance Vs Gate Voltage

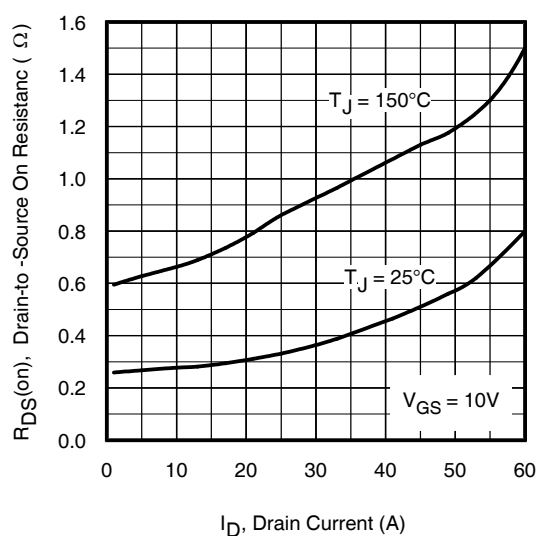


Fig 6. Typical On-Resistance Vs Drain Current

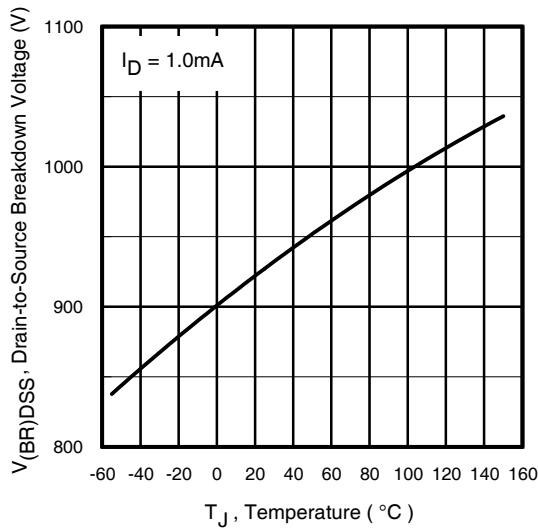


Fig 7. Typical Drain-to-Source Breakdown Voltage Vs Temperature

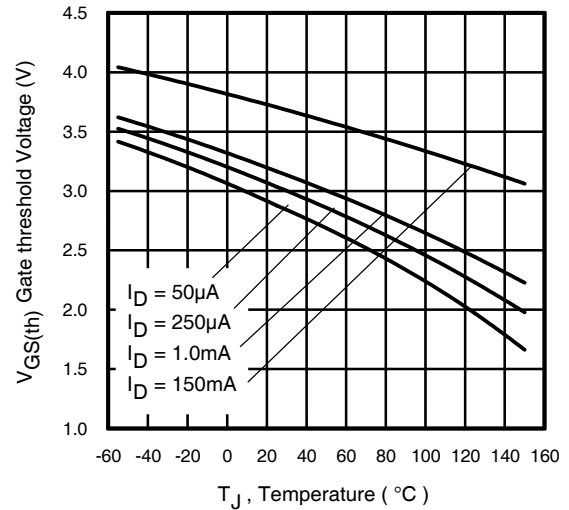


Fig 8. Typical Threshold Voltage Vs Temperature

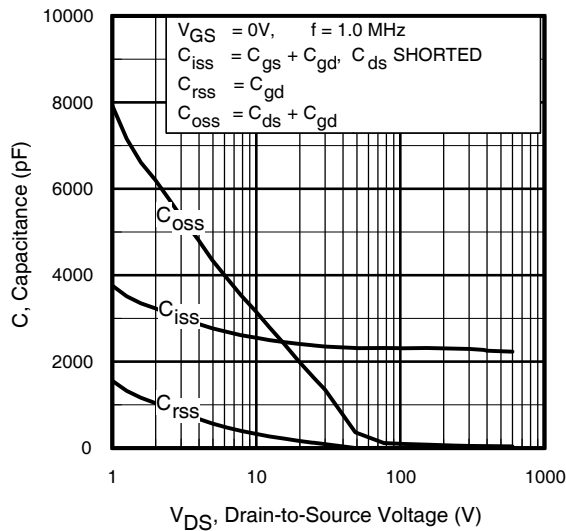


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

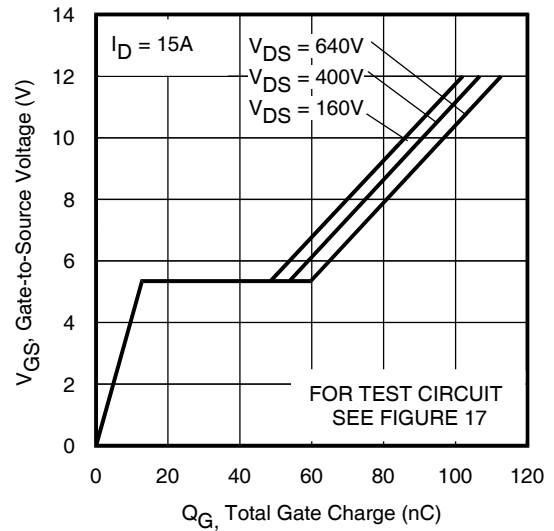


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

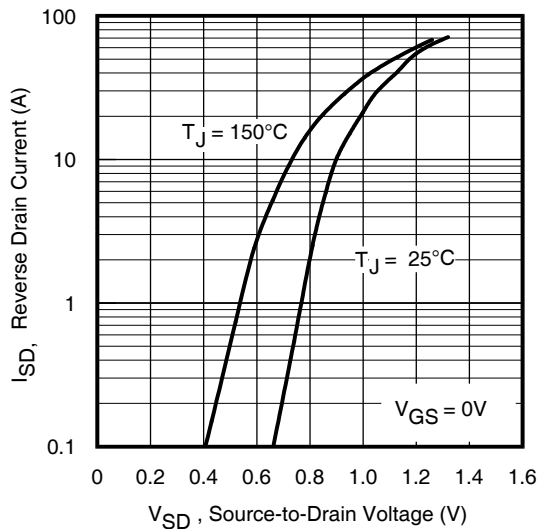


Fig 11. Typical Source-Drain Diode Forward Voltage

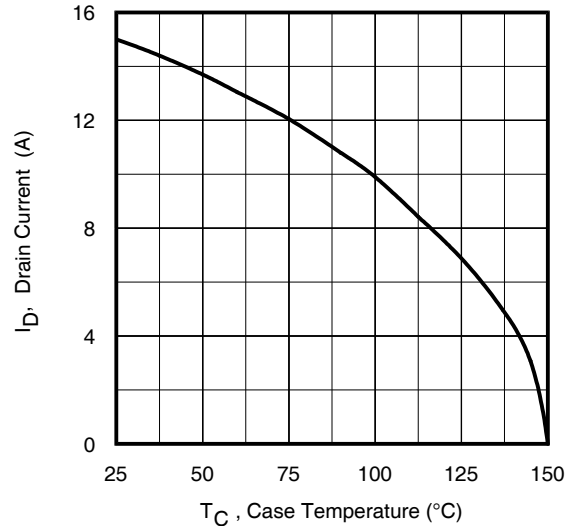


Fig 12. Maximum Drain Current Vs. Case Temperature

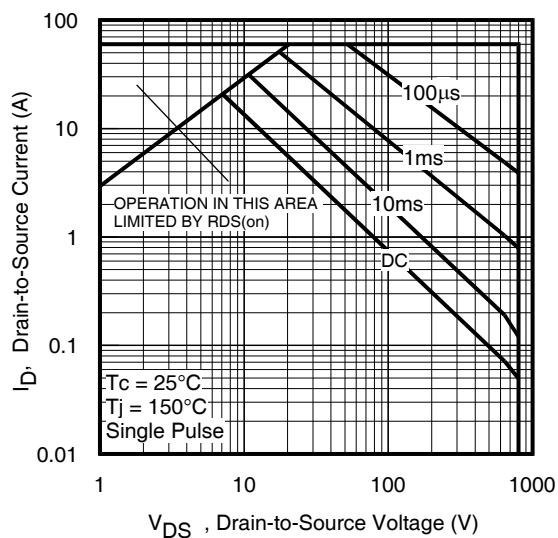


Fig 13. Maximum Safe Operating Area

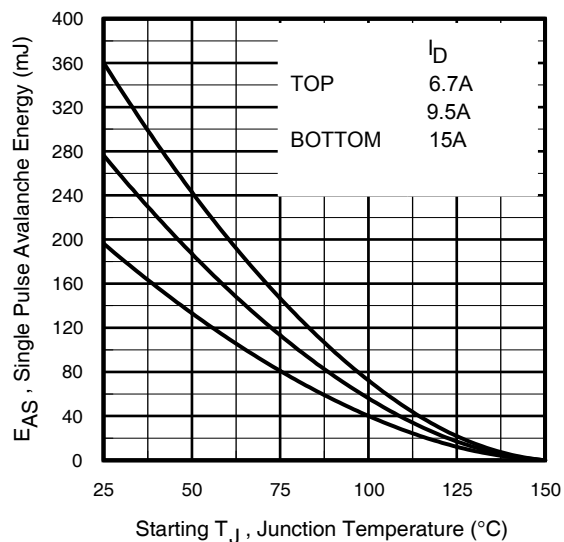


Fig 14. Maximum Avalanche Energy Vs. Drain Current

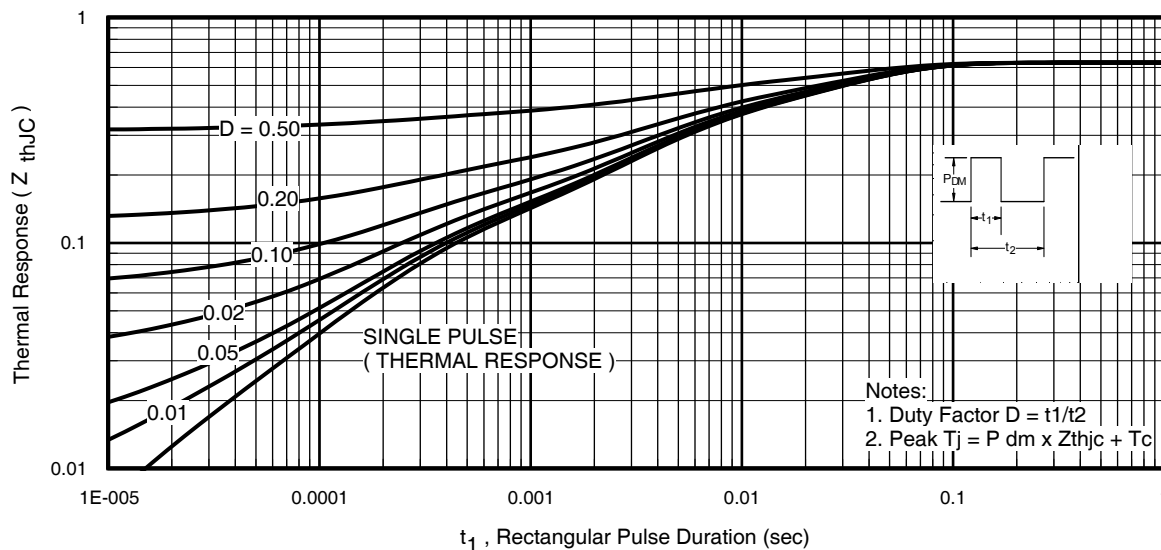


Fig 15. Maximum Effective Transient Thermal Impedance, Junction-to-Case

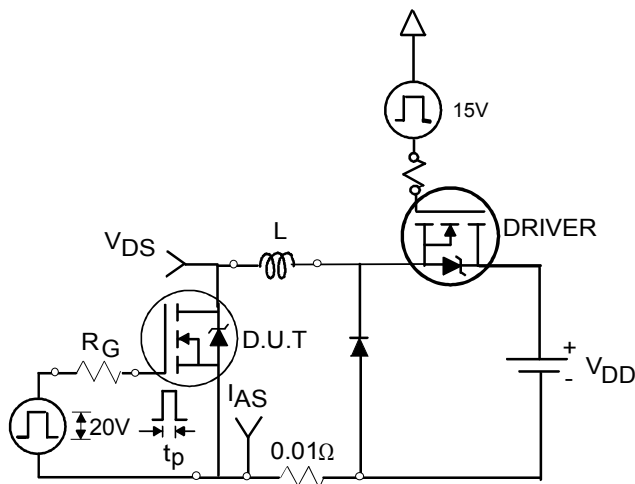


Fig 16a. Unclamped Inductive Test Circuit

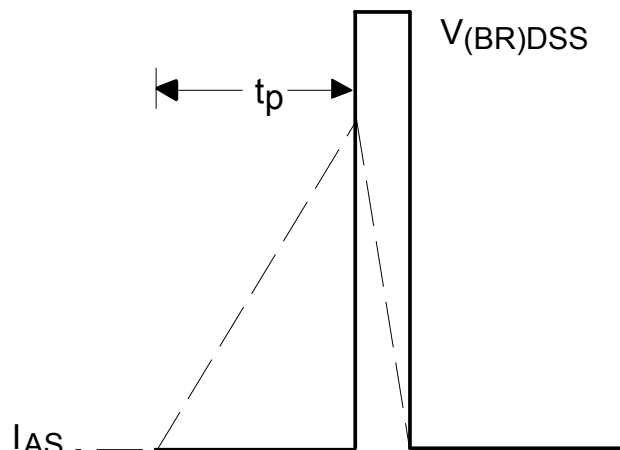


Fig 16b. Unclamped Inductive Waveforms

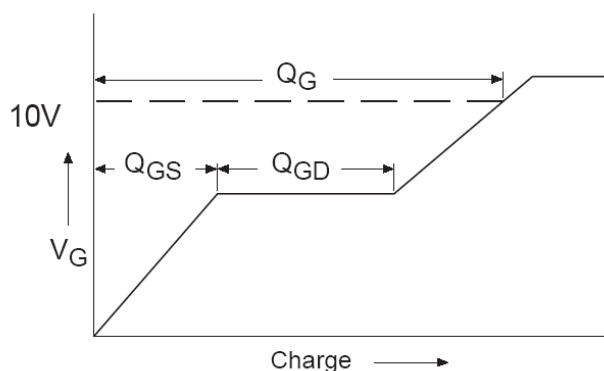


Fig 17a. Gate Charge Waveform

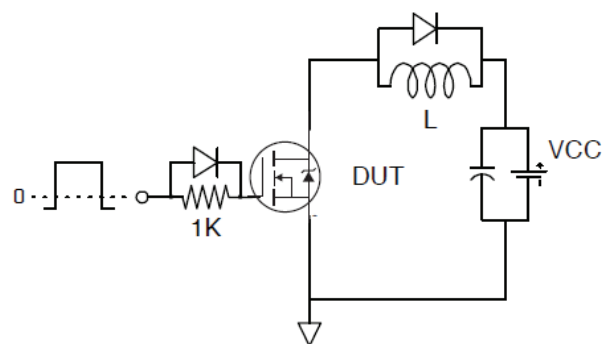


Fig 17b. Gate Charge Test Circuit

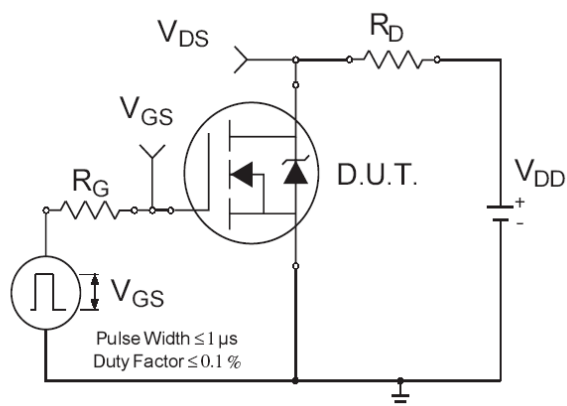


Fig 18a. Switching Time Test Circuit

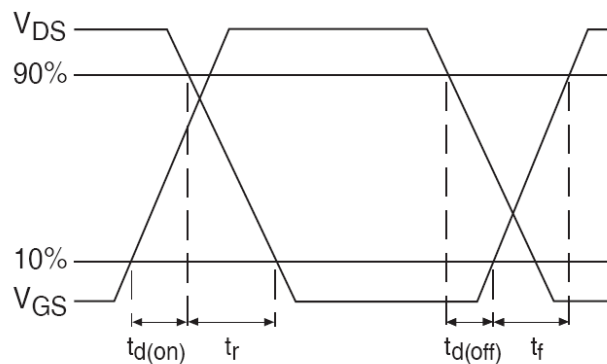
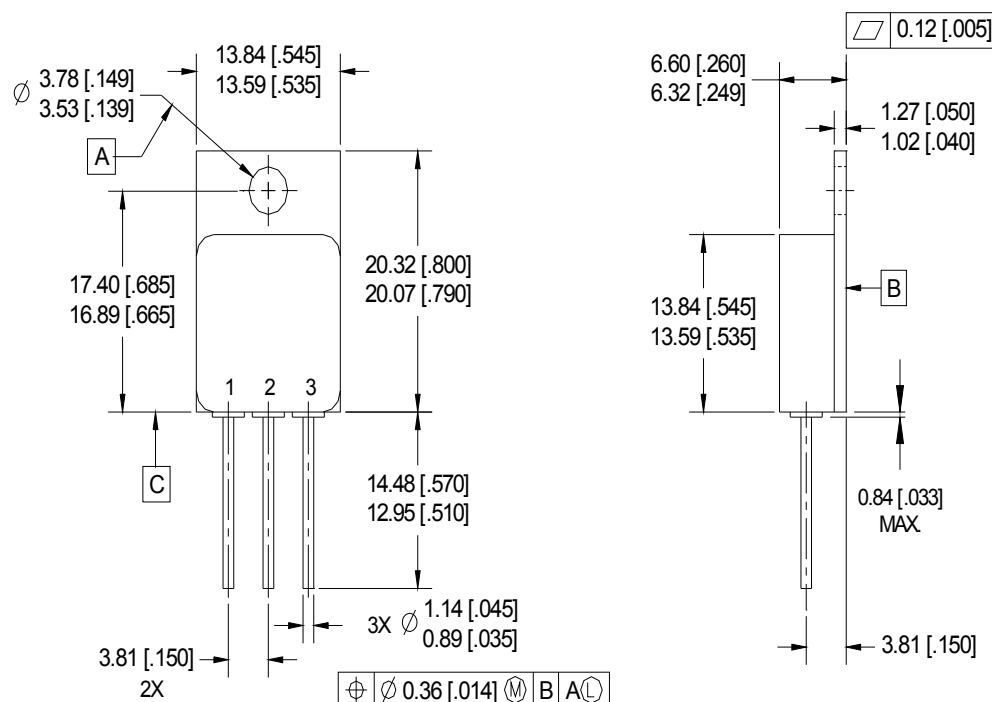


Fig 18b. Switching Time Waveforms

Case Outline and Dimensions - Low-Ohmic TO-254AA



NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. CONTROLLING DIMENSION: INCH.
4. CONFORMS TO JEDEC OUTLINE TO-254AA.

PIN ASSIGNMENTS

- 1 = DRAIN
- 2 = SOURCE
- 3 = GATE

BERYLLIA WARNING PER MIL-PRF-19500

Package containing beryllia shall not be ground, sandblasted, machined, or have other operations performed on them which will produce beryllia or beryllium dust. Furthermore, beryllium oxide packages shall not be placed in acids that will produce fumes containing beryllium.

IMPORTANT NOTICE

The information given in this document shall be in no event regarded as guarantee of conditions or characteristic. The data contained herein is a characterization of the component based on internal standards and is intended to demonstrate and provide guidance for typical part performance. It will require further evaluation, qualification and analysis to determine suitability in the application environment to confirm compliance to your system requirements.

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