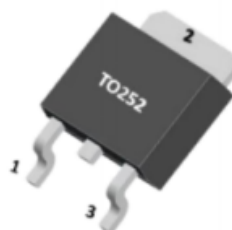


7N60

N-CHANNEL POWER MOSFET

7A, 600V N-CHANNEL POWER MOSFET DESCRIPTION

The 7N60 is a high voltage power MOSFET combines advanced planar MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

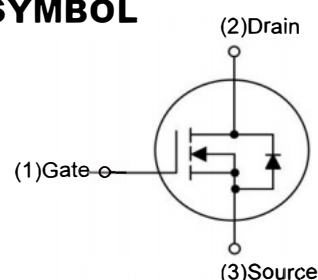


FEATURES

- * $R_{DS(ON)} \leq 1.2\Omega$ @ $V_{GS}=10V$, $I_D=3.5A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

ode

SYMBOL



ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ C$, unless otherwise specified.)

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		600	V
V_{GS}	Gate Source Voltage		± 30	V
I_D	Continuous Drain Current		7	A
I_{DM}	Drain Current Pulsed (Note 2)		14	A
EAS	Avalanche Energy, Single Pulsed (Note 3)		115	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		3.2	V/ns
P_D	Power Dissipation	TO-220F	35	W
		TO-252	52	
T_J	Junction Temperature		150	$^\circ C$
T_{STG}	Storage Temperature		-55 to 150	$^\circ C$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L = 1.0mH$, $I_{AS} = 15.2A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

4. $I_{SD} \leq 7.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DS}$, Starting $T_J = 25^\circ C$



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THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-252		110	
Junction to Case	TO-220F	θ_{JC}	3.57	$^{\circ}\text{C/W}$
	TO-252 (Note)		2.4	

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

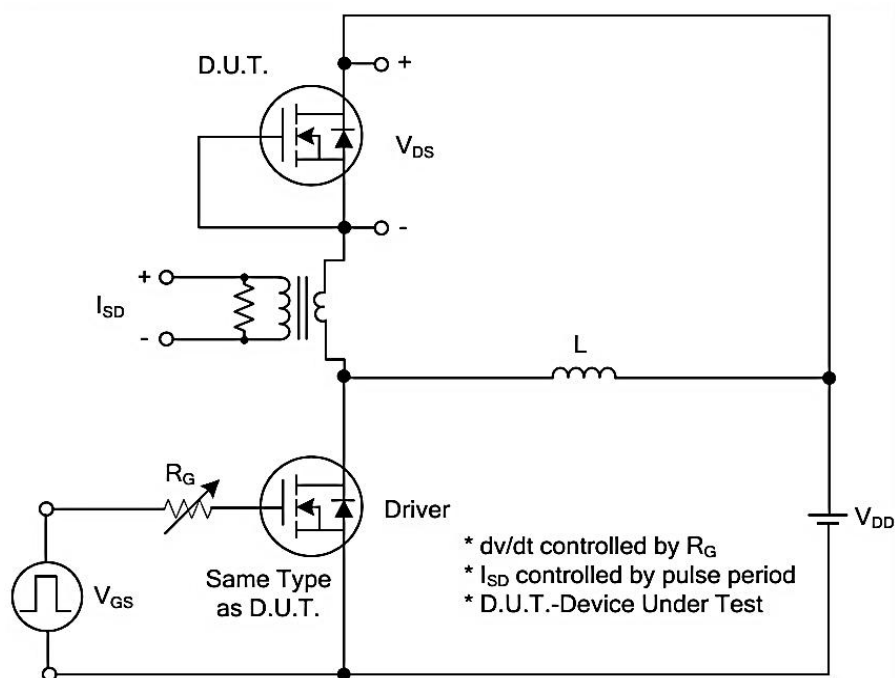
ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	600			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3.5A			1.2	Ω
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} ,I _D =250μA	2.0		4.0	V
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1010		pF
Output Capacitance	C _{OSS}			105		
Reverse Transfer Capacitance	C _{RSS}			8		
SWITCHING PARAMETERS						
Total gate charge(Note 1)	Q _g	V _{DS} =480V,V _{GS} =10V I _D =7A, I _{GM} =1mA (Note 1, 2)		25		nC
Gate-source charge	Q _{gs}			6.5		
Gate-drain charge	Q _{gd}			5		
Turn-On Delay Time(Note 1)	t _{D(on)}	V _{DS} =100V,V _{GS} =10V I _D =7A,R _G =25Ω (Note 1, 2)		10		nS
Turn-On Rise time	t _r			20		
Turn-Off Delay Time	t _{D(off)}			70		
Turn-Off Fall time	t _f			32		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				7	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				14	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _{SD} =7A			1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} = 0 V, I _{SD} =7A,		315		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		7		μC

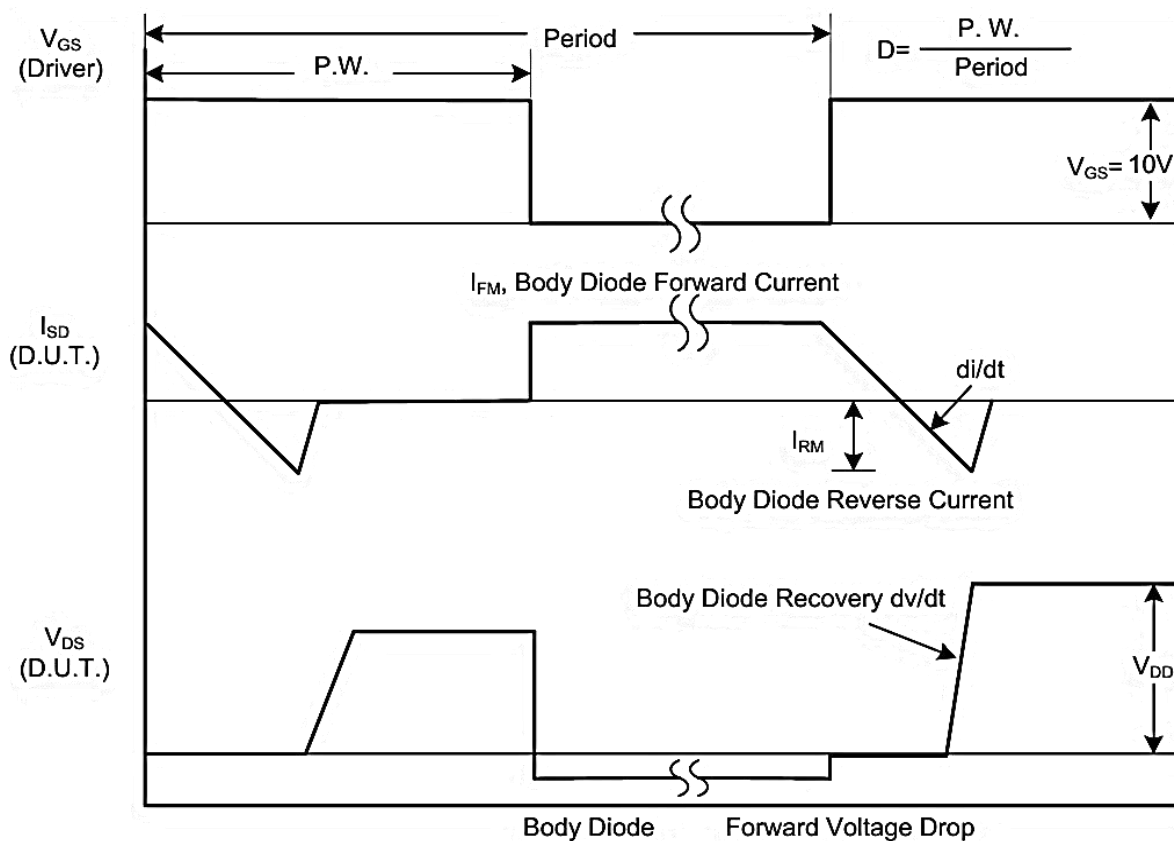
Note:

1. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$;
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit

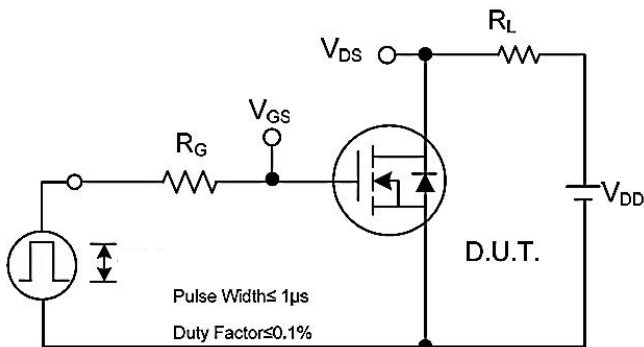


Peak Diode Recovery dv/dt Waveforms

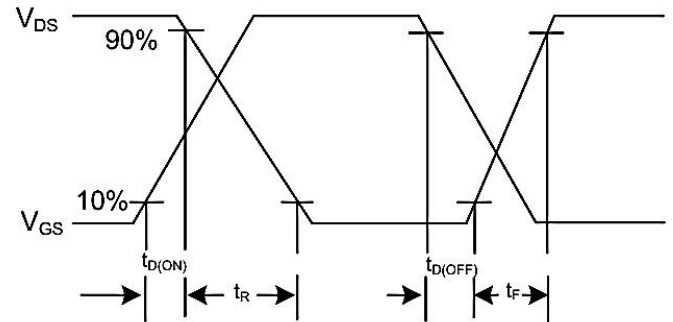
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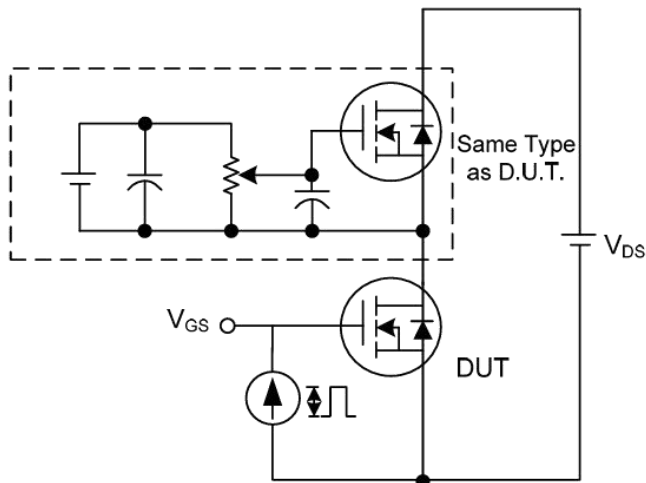
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



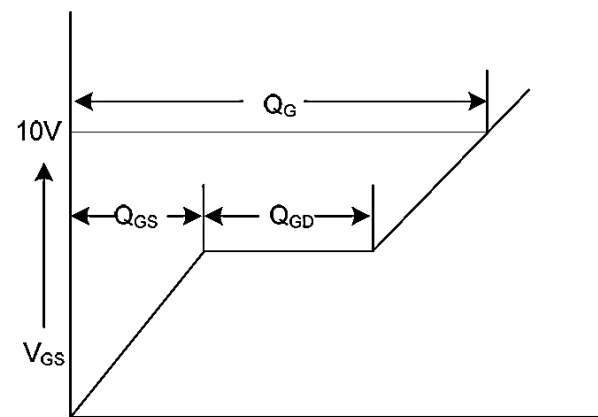
Switching Test Circuit



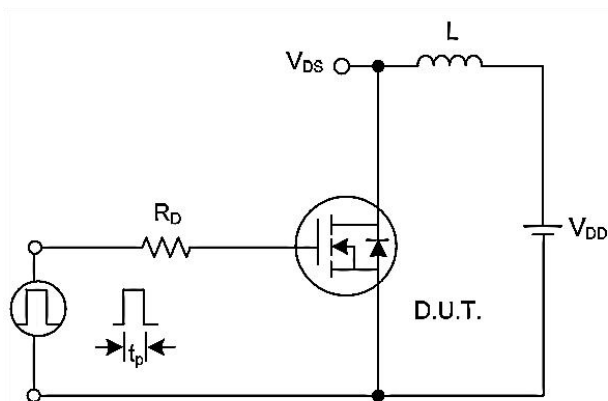
Switching Waveforms



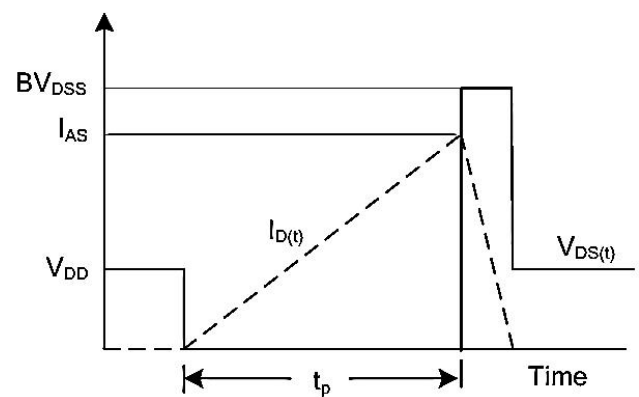
Gate Charge Test Circuit



Charge Gate Charge Waveform

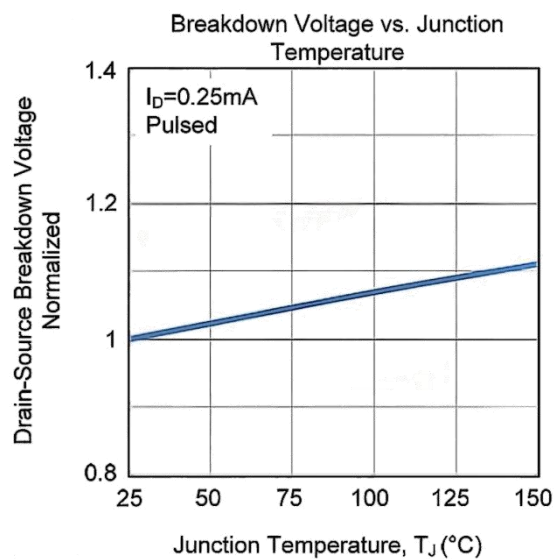
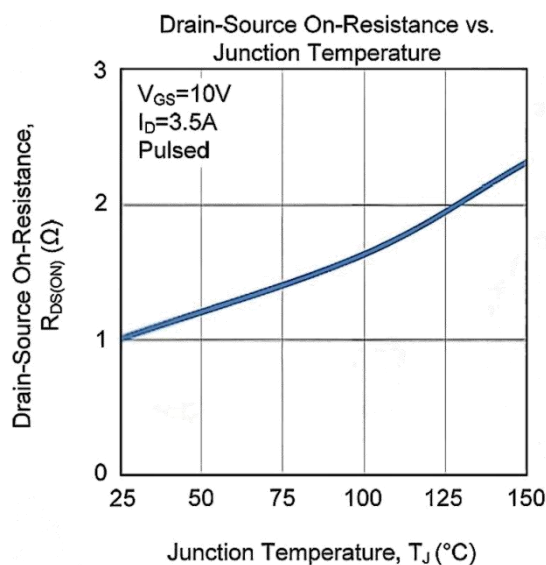
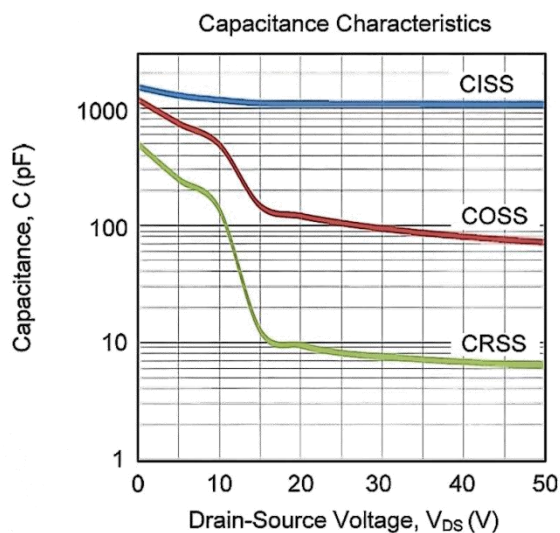
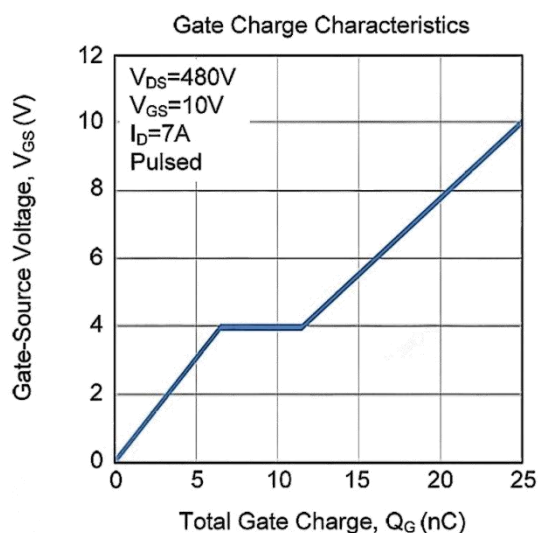
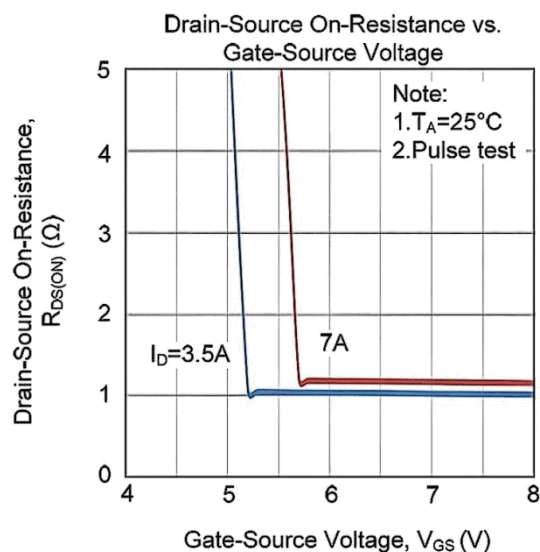
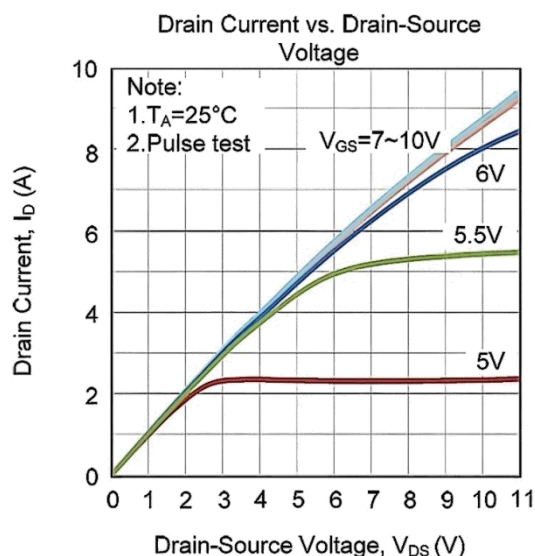


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

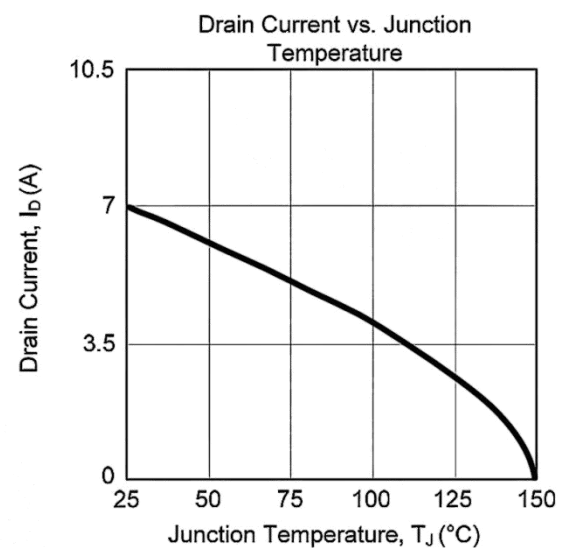
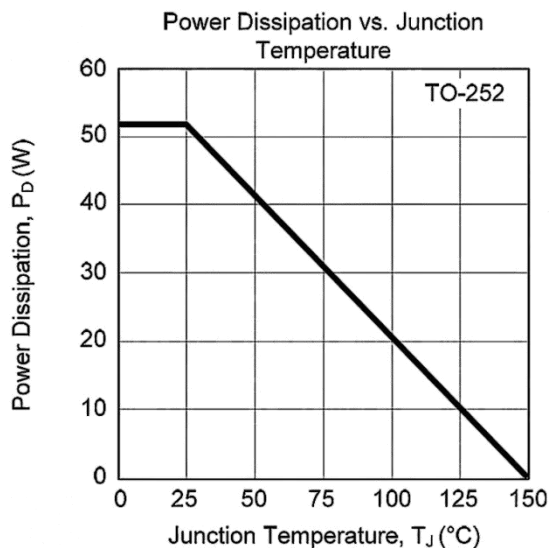
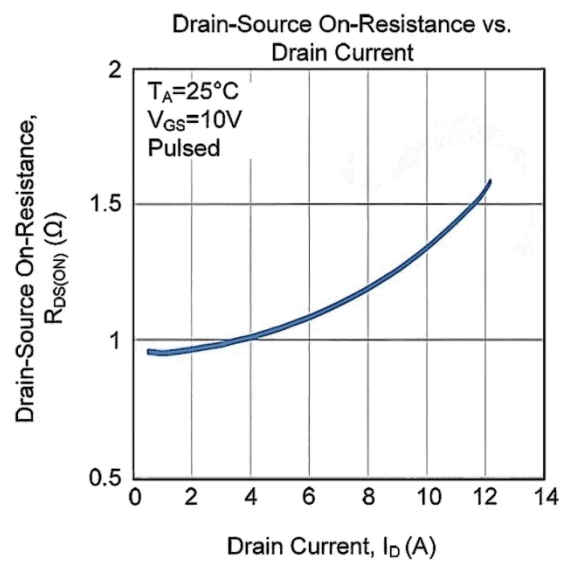
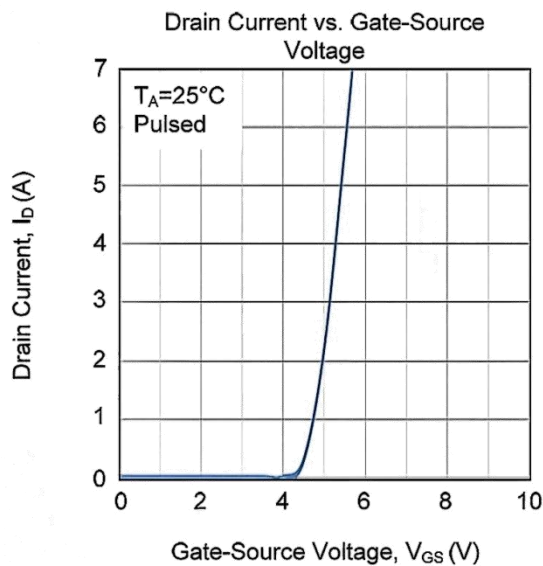
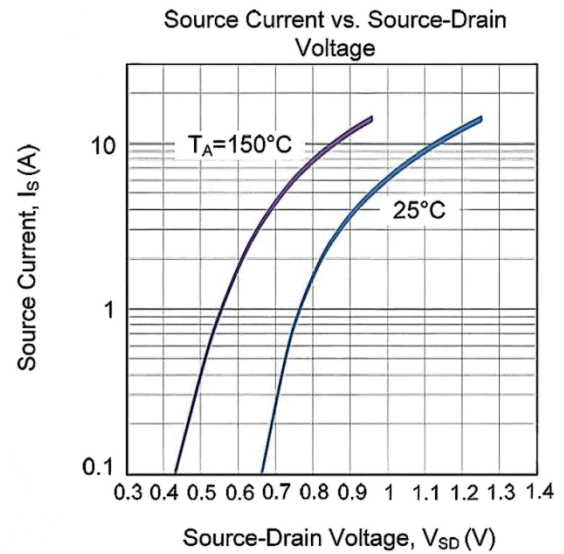
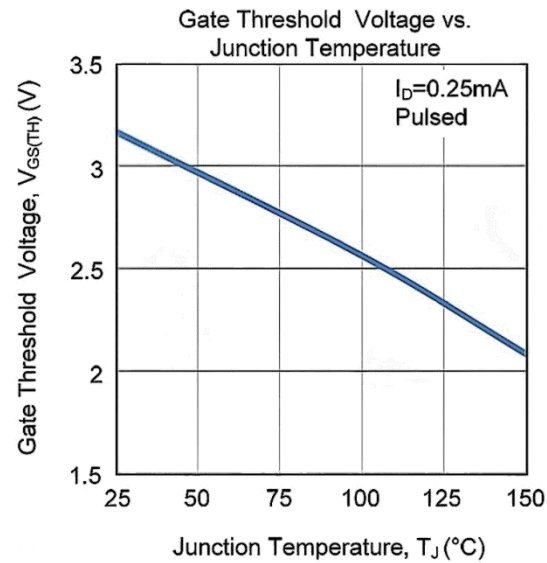
TYPICAL CHARACTERISTICS(1)



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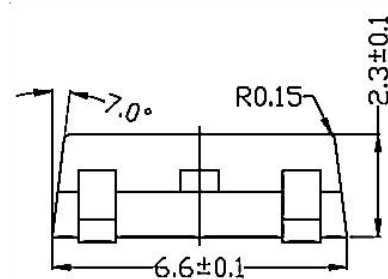
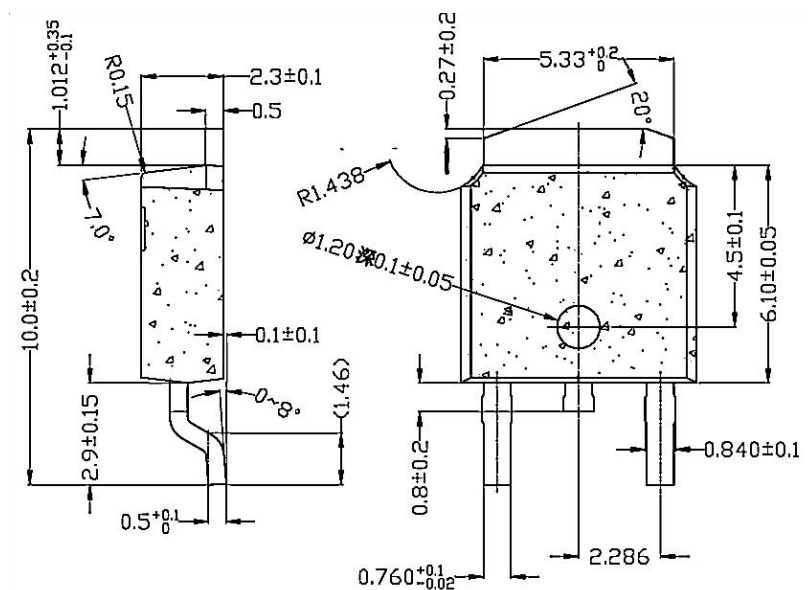
TYPICAL CHARACTERISTICS(Con.t)



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TO - 252 PACKAGE OUTLINE DIMENSIONS



TO - 252 PACKING INFORMATION

Package version	Reel dimensions $\Phi \times H$ (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions $L \times W \times H$ (mm)	Outer box (pcs)	Outer box dimensions $L \times W \times H$ (mm)
T0-252	$\Phi 330 \times 20$	2500	2	360*340*50	25000	375*375*280