



Complementary High Density Trench MOSFET

PRIMARY CHARACTERISTICS

N-Channel

BV _{DSS}	R _{DS(on)} Max	I _D
30V	30mΩ@V _{GS} =10V	4.5A
	44mΩ@V _{GS} =4.5V	3.5A

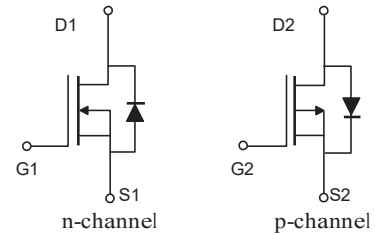
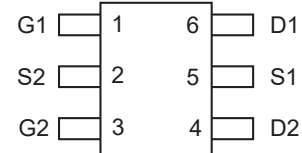
P-Channel

BV _{DSS}	R _{DS(on)} Max	I _D
-30V	70mΩ@V _{GS} =-10V	-3.5A
	95mΩ@V _{GS} =-4.5V	-3.0A

DESCRIPTION

- The enhancement mode MOS is extremely density cell and low on-resistance

SOT-23-6 PACKAGE



MECHANICAL DATA

- Case : Molded plastic, SOT-23-6
- Polarity : Shown above
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Epoxy : UL94-V0 rated flame retardant

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V _{DS}	30	-30	V
Gate-Source Voltage		V _{GS}	± 20	± 20	V
Drain Current-Continuous ^a @ T _A = 25 °C -Pulse ^b		I _D	4.5	-3.5	A
		I _{DM}	18	-14	A
Drain-Source Diode Forward Current ^a		I _S	2.5	-1.9	A
Maximum Power Dissipation ^a	TA=25°C	P _D	1.25		W
	TA=75°C		0.75		
Operating Junction and Storage Temperature Range		T _J ,T _{STG}	- 55 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{thJA}	100	°C/W
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Note :

a. Surface Mounted on FR4 Board , t ≤ 5sec .

b. Pulse width limited by maximum junction temperature.



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N-Channel ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V , I _D = 250uA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V , V _{GS} = 0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ±20V , V _{DS} = 0V			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	1	1.5	3	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10V , I _D = 4.5A		24	30	mΩ
		V _{GS} = 4.5V , I _D = 3.5A		35	44	
Forward Transconductance	g _{fs}	V _{DS} = 15V , I _D = 4.5A		8.3		S
DRAIN-SOURCE DIODE CHARACTERISTICS ^b						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V , I _S = 1.0A		0.76	1.0	V
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} = 10V , V _{GS} = 0V f = 1.0MHz		402		pF
Output Capacitance	C _{OSS}			96		pF
Reverse Transfer Capacitance	C _{RSS}			73		pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 15V , I _D = 1A V _{GEN} = 10V R _L = 15 ohm R _{GEN} = 6 ohm		8.0		ns
Rise Time	t _r			2.4		ns
Turn-Off Delay Time	t _{D(OFF)}			20.6		ns
Fall Time	t _f			3.8		ns
Total Gate Charge	Q _g	V _{DS} = 10V I _D = 1A V _{GS} = 10V		8.4		nC
Gate-Source Charge	Q _{gs}			1.7		nC
Gate-Drain Charge	Q _{gd}			1.3		nC

Note :

b. Pulse Test : Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

c. Guaranteed by design, not subject to production testing.



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P-Channel ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V , I _D = -250uA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -24V , V _{GS} = 0V			-1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ±20V , V _{DS} = 0V			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250uA	-1	-1.4	-3	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = -10V , I _D = -3.5A		56	70	mΩ
		V _{GS} = -4.5V , I _D = -3.0A		73	95	
Forward Transconductance	g _{fs}	V _{DS} = -15V , I _D = -3.5A		10.2		S
DRAIN-SOURCE DIODE CHARACTERISTICS ^b						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V , I _S = -1.9A		-0.85	-1.3	V
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} = -15V , V _{GS} = 0V f = 1.0MHz		490		pF
Output Capacitance	C _{OSS}			66		pF
Reverse Transfer Capacitance	C _{RSS}			53		pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = -15V , I _D = -1A V _{GEN} = -10V R _L = 15 ohm R _{GEN} = 6 ohm		4.4		ns
Rise Time	t _r			2.2		ns
Turn-Off Delay Time	t _{D(OFF)}			22		ns
Fall Time	t _f			4.2		ns
Total Gate Charge	Q _g	V _{DS} = -15V I _D = -1A V _{GS} = -10V		10		nC
Gate-Source Charge	Q _{gs}			1.5		nC
Gate-Drain Charge	Q _{gd}			1.4		nC

Note :

b. Pulse Test : Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

c. Guaranteed by design, not subject to production testing.



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N-Channel:

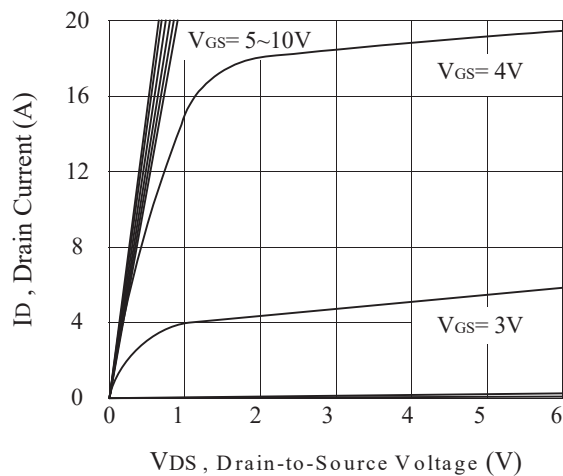


Figure 1. Output Characteristics

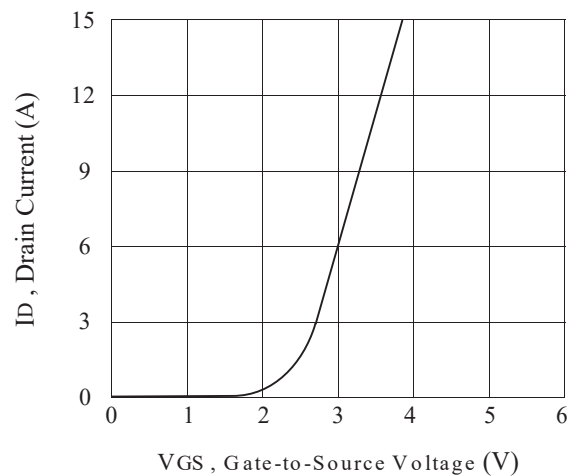


Figure 2. Transfer Characteristics

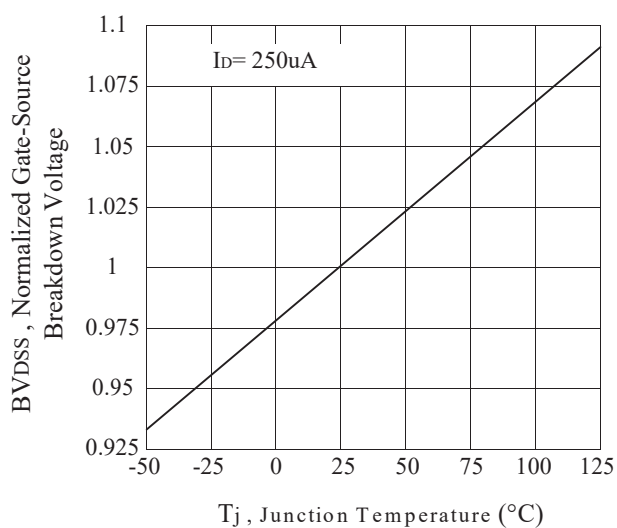


Figure 3. Breakdown Voltage Variation with Temperature

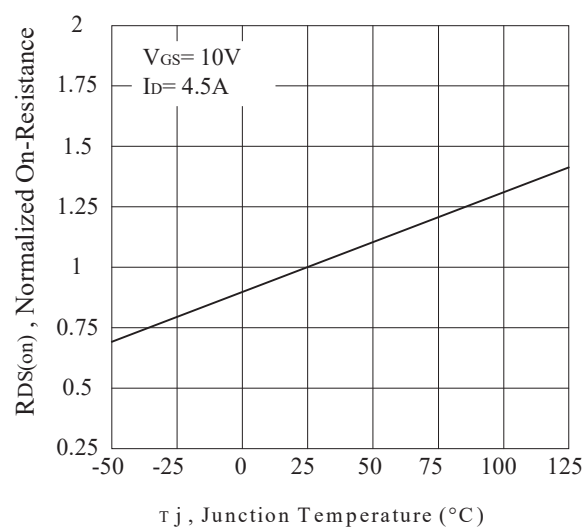


Figure 4. On-Resistance Variation with Temperature

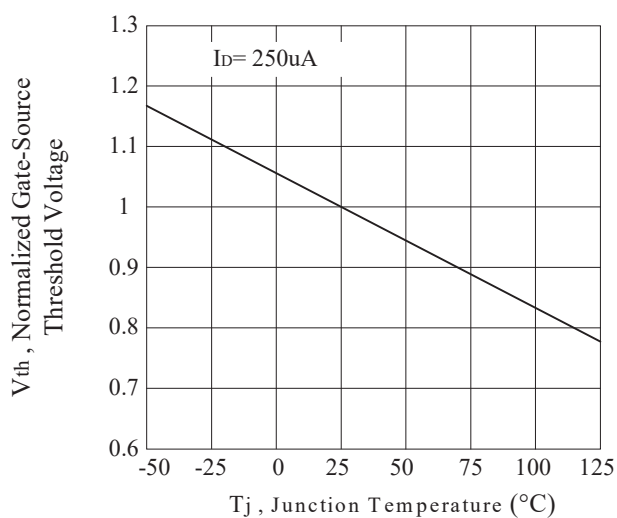


Figure 5. Gate Threshold Variation with Temperature

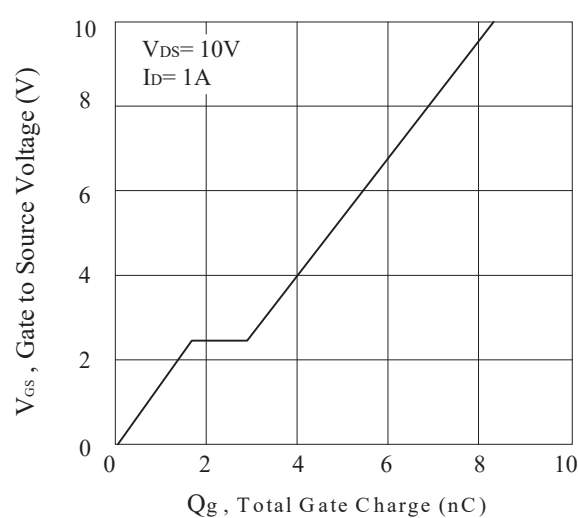
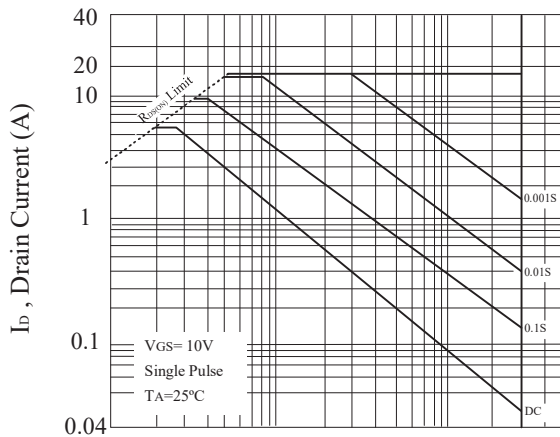


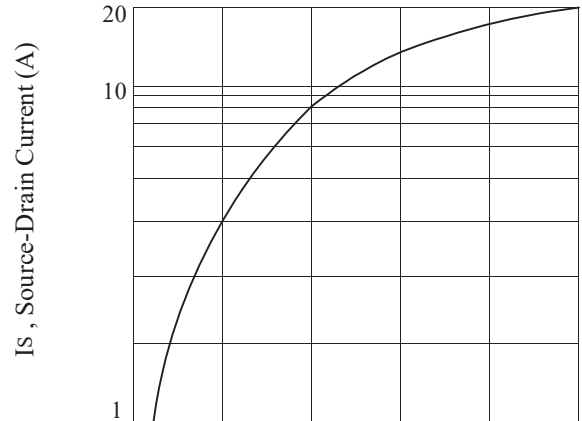
Figure 6. Gate Charge



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V_{DS} , Drain-Source Voltage (V)
Figure 7. Maximum Safe Operating Area



V_{SD} , Body Diode Forward Voltage (V)
Figure 8. Body Diode Forward Voltage Variation with Source Current

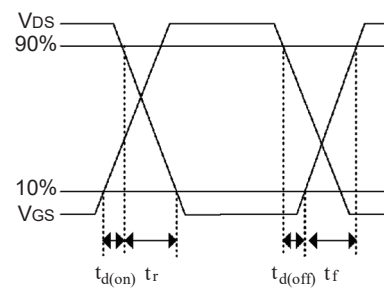
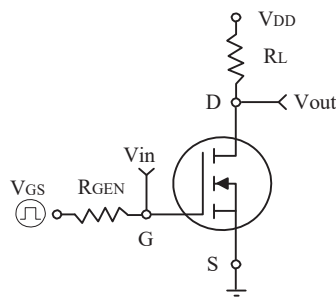


Figure 9. Switching Test Circuit and Switching Waveforms

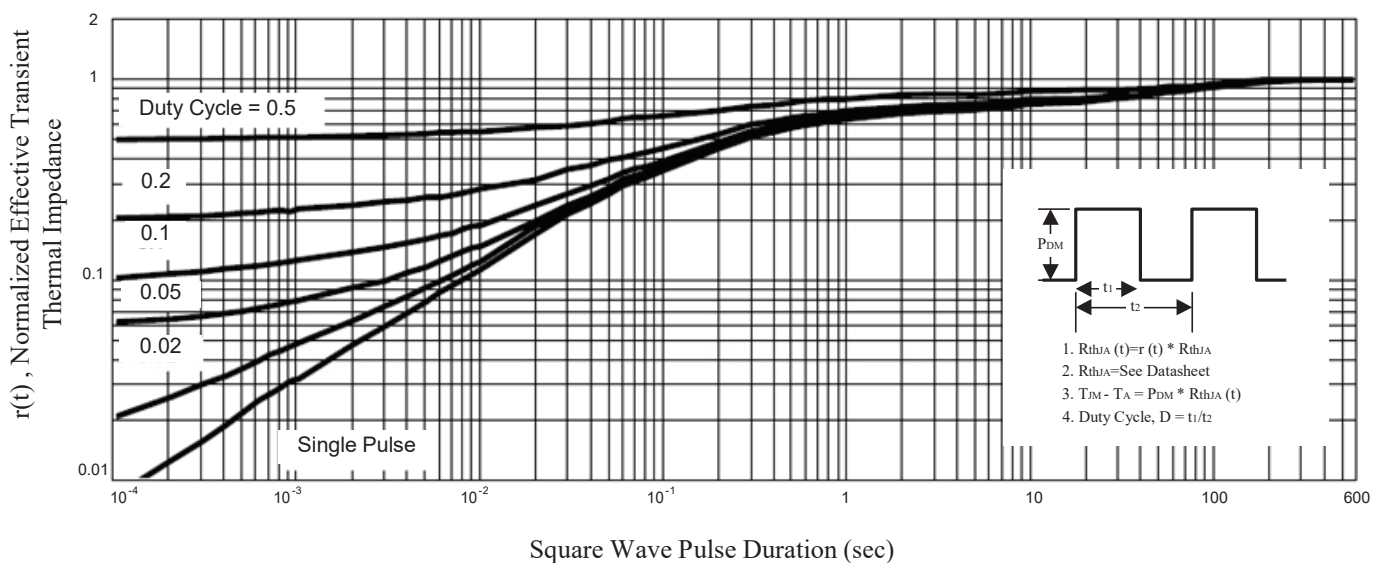


Figure 10. Normalized Thermal Transient Impedance Curve



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P-Channel:

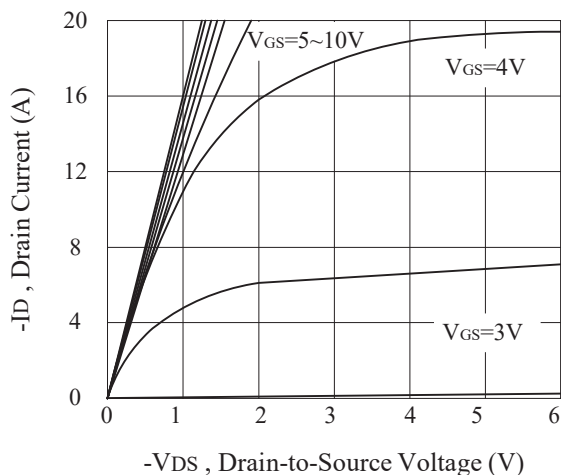


Figure 11. Output Characteristics

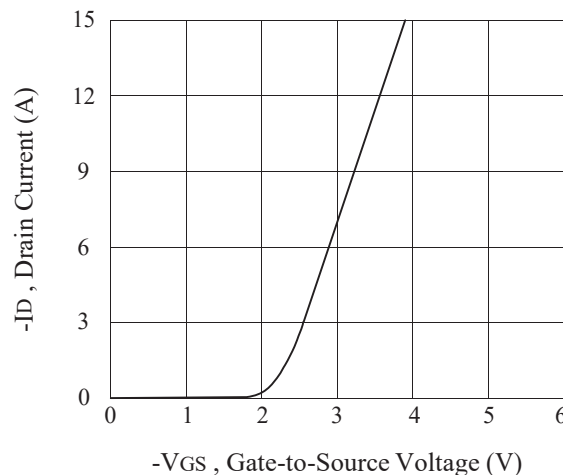


Figure 12. Transfer Characteristics

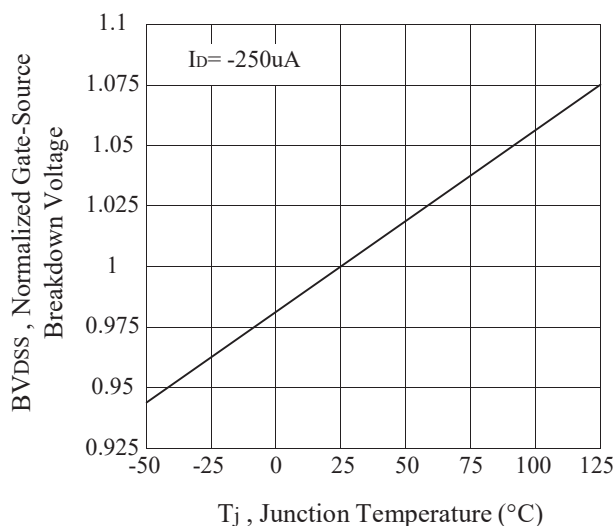


Figure 13. Breakdown Voltage Variation with Temperature

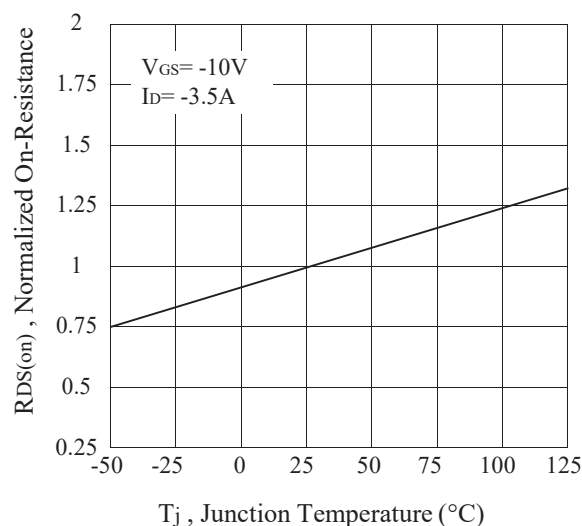


Figure 14. On-Resistance Variation with Temperature

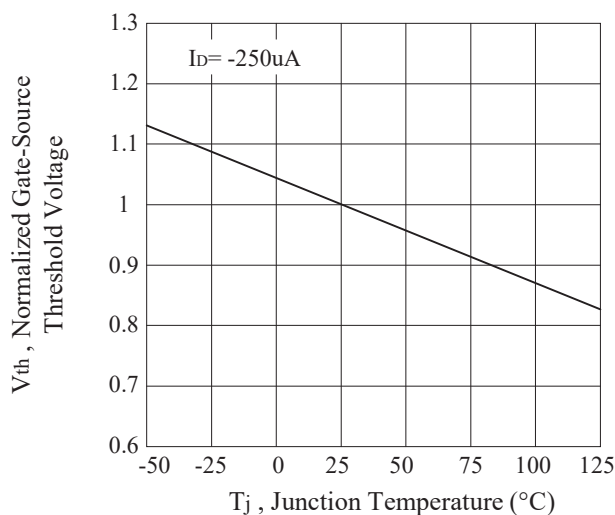


Figure 15. Gate Threshold Variation with Temperature

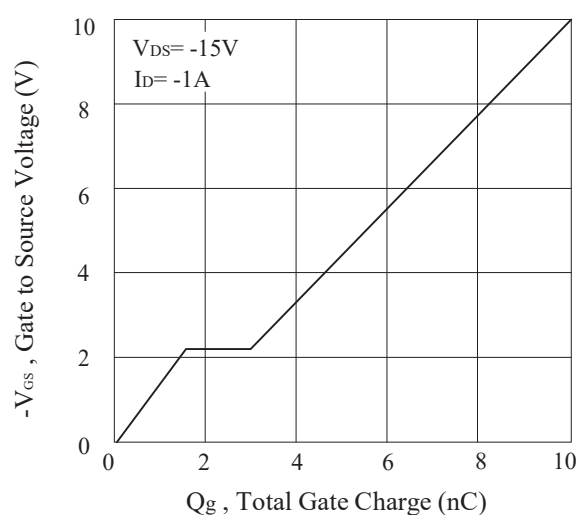


Figure 16. Gate Charge



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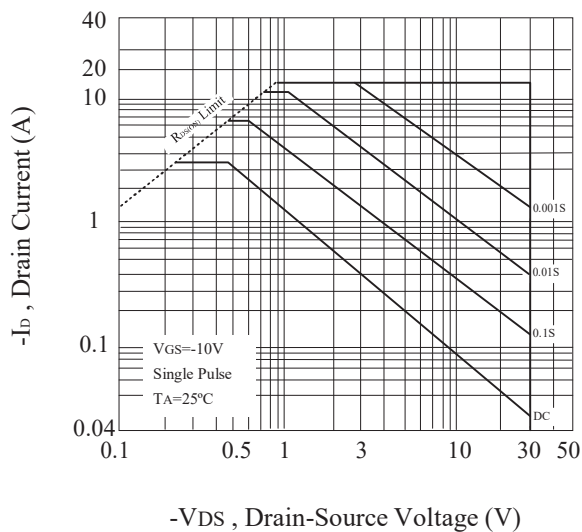


Figure 17. Maximum Safe Operating Area

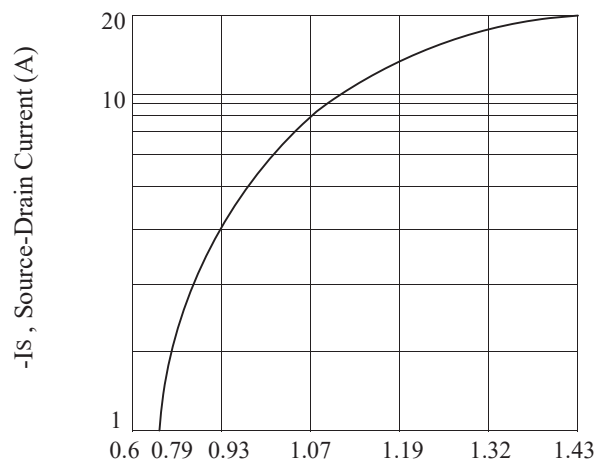


Figure 18. Body Diode Forward Voltage Variation with Source Current

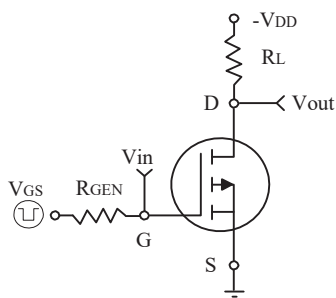


Figure 19. Switching Test Circuit and Switching Waveforms

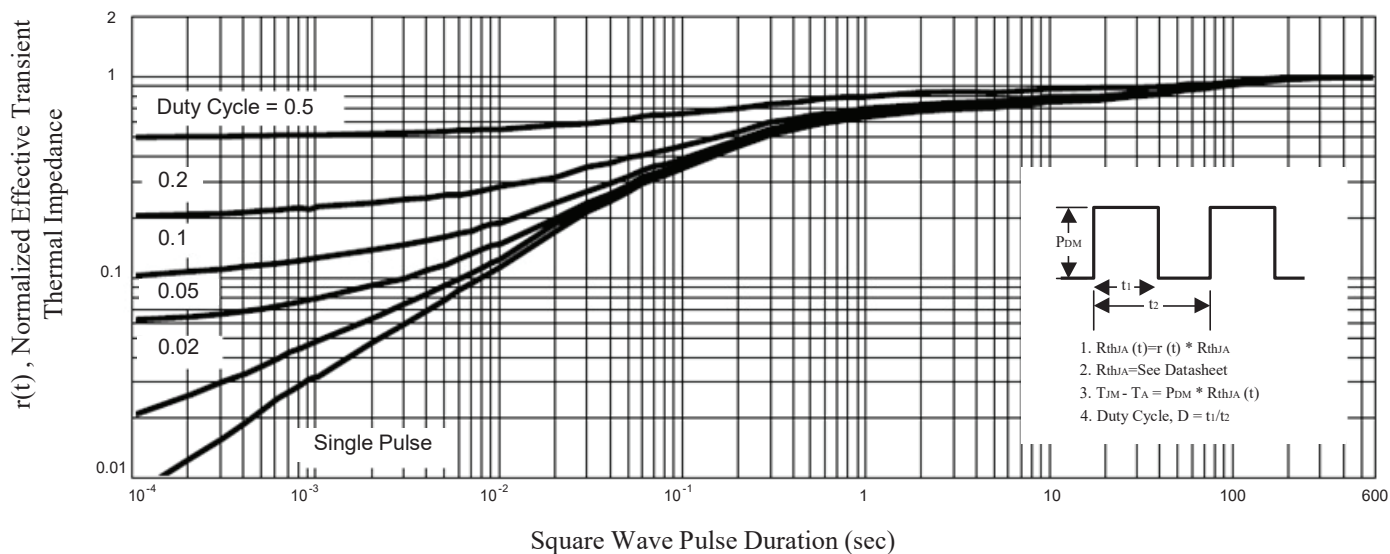
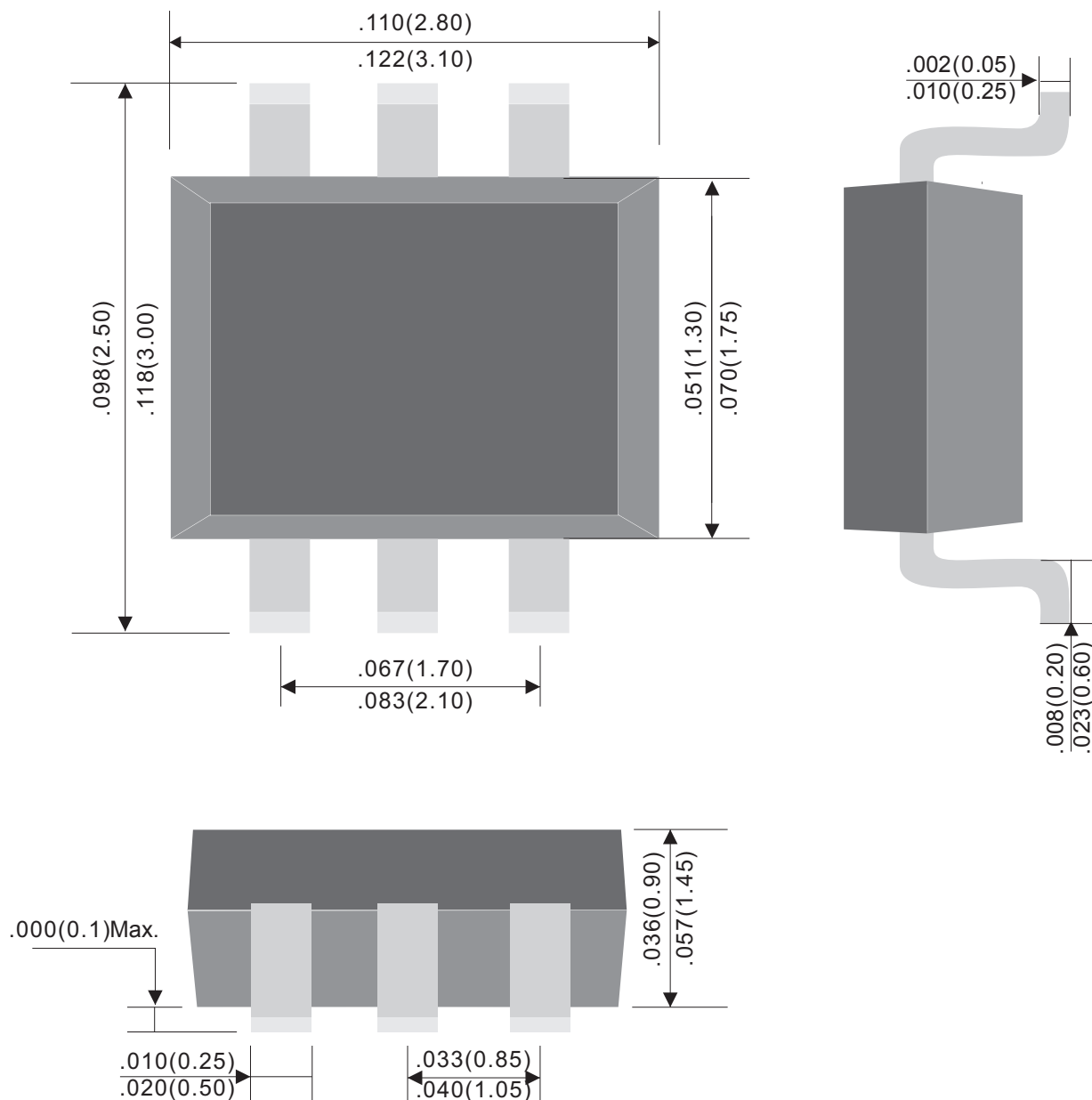


Figure 20. Normalized Thermal Transient Impedance Curve



Outline Drawing

SOT-23-6



Dimensions in inches and (millimeters)

Rev.D

**Ordering Information:**

Device PN	Marking ⁽⁴⁾	Packing
ST8958-T ⁽¹⁾ H ⁽²⁾ -WS ⁽³⁾	9B	Tape&Reel: 3Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) Packing code suffix "G" for RoHS product ; Packing code Suffix "H" for halogen free product.
All materials and products supplied comply with the U.S. Toxic Substances Control Act statement, PBT Chemicals.

(3) Willas brand abbreviation, Label Type does not display

(4) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device

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