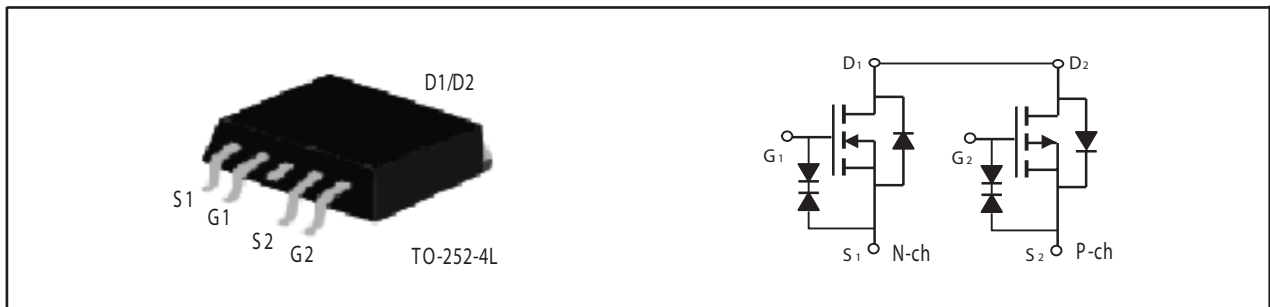




Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
30V	16A	24 @ V _{GS} =10V
		35 @ V _{GS} =4.5V

PRODUCT SUMMARY (P-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
-30V	-15A	33 @ V _{GS} =-10V
		52 @ V _{GS} =-4.5V



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

Symbol	Parameter	N-Channel	P-Channel	Units	
V _{DS}	Drain-Source Voltage	30	-30	V	
V _{GS}	Gate-Source Voltage	±20	±20	V	
I _D	Drain Current-Continuous ^a	T _C =25°C	16	-15	A
		T _C =70°C	12.5	-11.5	A
I _{DM}	-Pulsed ^b	45	-43	A	
I _{AS}	Single Pulse Avalanche Current ^d	7.5	5.0	A	
E _{AS}	Single Pulse Avalanche Energy ^d				L=0.5mH
P _D	Maximum Power Dissipation ^a	T _C =25°C	10		W
		T _C =70°C	6.5		W
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 150		°C	

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case ^a	12	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient ^a	60	°C/W

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N-Channel ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} =0V			±10	uA
ON CHARACTERISTICS						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	2	3	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =8A		19	24	m ohm
		V _{GS} =4.5V, I _D =6.5A		26	35	m ohm
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =8A		14		S
DYNAMIC CHARACTERISTICS ^c						
C _{ISS}	Input Capacitance	V _{DS} =15V, V _{GS} =0V f=1.0MHz		440		pF
C _{OSS}	Output Capacitance			130		pF
C _{RSS}	Reverse Transfer Capacitance			70		pF
SWITCHING CHARACTERISTICS ^c						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =15V I _D =1A		10		ns
t _r	Rise Time			11.5		ns
t _{D(OFF)}	Turn-Off Delay Time	V _{GS} =10V		17		ns
t _f	Fall Time	R _{GEN} =6 ohm		22		ns
Q _g	Total Gate Charge	V _{DS} =15V, I _D =8A, V _{GS} =10V		8.3		nC
		V _{DS} =15V, I _D =8A, V _{GS} =4.5V		4.3		nC
Q _{gs}	Gate-Source Charge	V _{DS} =15V, I _D =8A,		1.4		nC
Q _{gd}	Gate-Drain Charge	V _{GS} =10V		2.1		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I _S	Maximum Continuous Drain-Source Diode Forward Current				1	A
V _{SD}	Diode Forward Voltage ^b	V _{GS} =0V, I _S =1A		0.77	1.3	V

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P-Channel ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
OFF CHARACTERISTICS							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-30			V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V , V _{GS} =0V			-1	uA	
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V , V _{DS} =0V			±10	uA	
ON CHARACTERISTICS							
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-1	-1.7	-3	V	
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V , I _D =-7.5A		26	33	m ohm	
		V _{GS} =-4.5V , I _D =-6A		39	52	m ohm	
g _{FS}	Forward Transconductance	V _{DS} =-10V , I _D =-7.5A		10		S	
DYNAMIC CHARACTERISTICS ^c							
C _{ISS}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V f=1.0MHz		815		pF	
C _{OSS}	Output Capacitance				225		pF
C _{RSS}	Reverse Transfer Capacitance				130		pF
SWITCHING CHARACTERISTICS ^c							
t _{D(ON)}	Turn-On Delay Time	V _{DD} =-15V I _D =-1A		11.8		ns	
t _r	Rise Time				18		ns
t _{D(OFF)}	Turn-Off Delay Time	V _{GS} =-10V		65		ns	
t _f	Fall Time	R _{GEN} =6 ohm		39		ns	
Q _g	Total Gate Charge	V _{DS} =-15V, I _D =-7.5A, V _{GS} =-10V		16		nC	
		V _{DS} =-15V, I _D =-7.5A, V _{GS} =-4.5V		7.8		nC	
Q _{gs}	Gate-Source Charge	V _{DS} =-15V, I _D =-7.5A,		1.6		nC	
Q _{gd}	Gate-Drain Charge	V _{GS} =-10V		4.8		nC	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
I _S	Maximum Continuous Drain-Source Diode Forward Current				-2	A	
V _{SD}	Diode Forward Voltage ^b	V _{GS} =0V, I _S =-2A		-0.78	-1.3	V	
Notes a. Surface Mounted on FR4 Board, t ≤ 10sec. b. Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%. c. Guaranteed by design, not subject to production testing. d. Starting T _J =25°C, L=0.5mH, V _{DD} = 30V. (See Figure13)							

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N-Channel

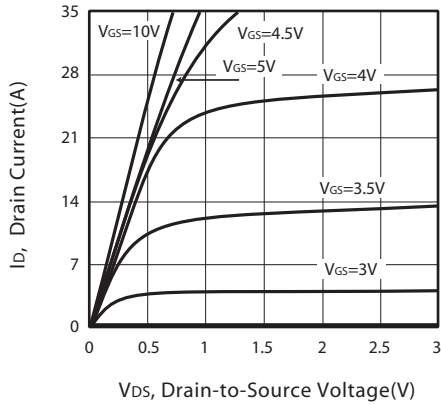


Figure 1. Output Characteristics

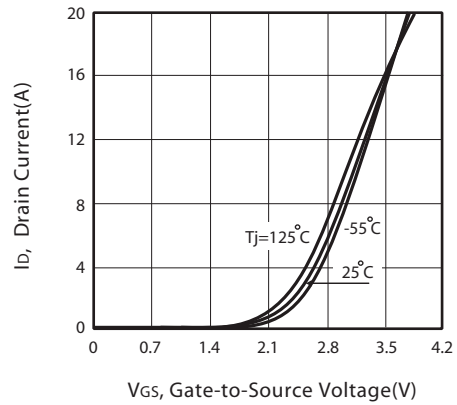


Figure 2. Transfer Characteristics

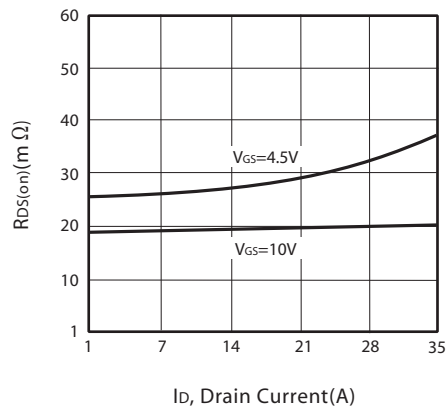


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

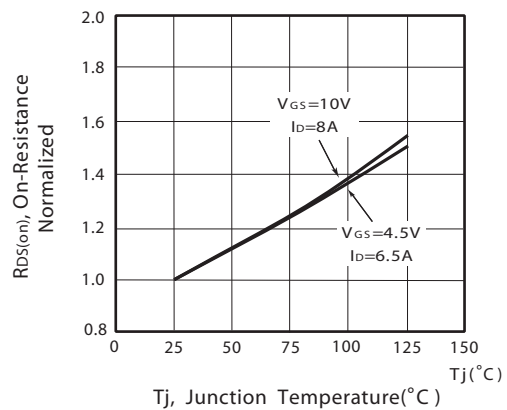


Figure 4. On-Resistance Variation with Drain Current and Temperature

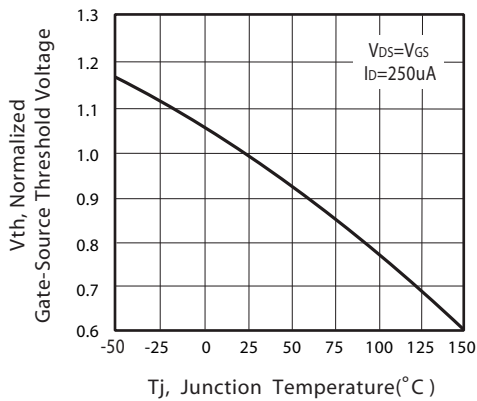


Figure 5. Gate Threshold Variation with Temperature

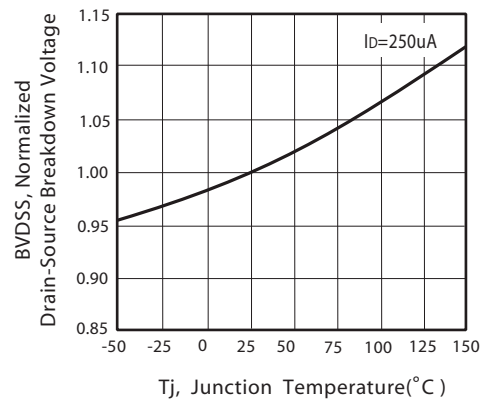


Figure 6. Breakdown Voltage Variation with Temperature

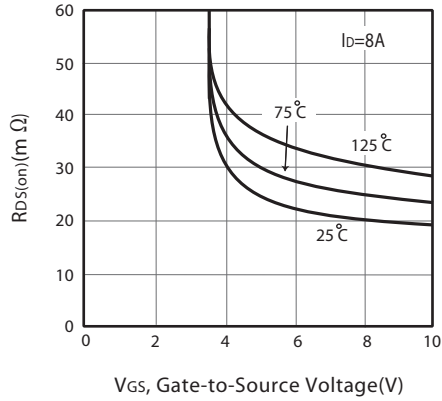


Figure 7. On-Resistance vs. Gate-Source Voltage

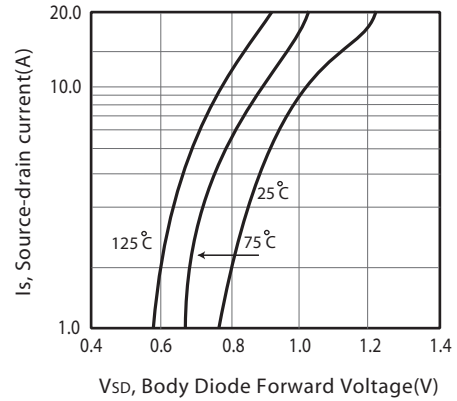


Figure 8. Body Diode Forward Voltage Variation with Source Current

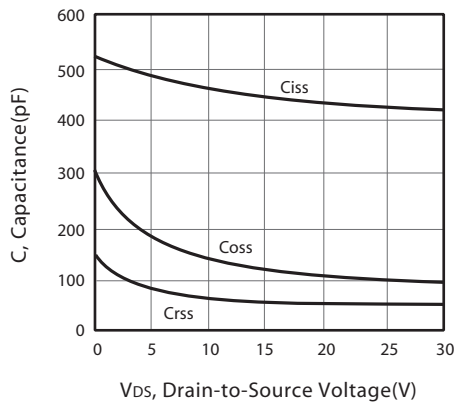


Figure 9. Capacitance

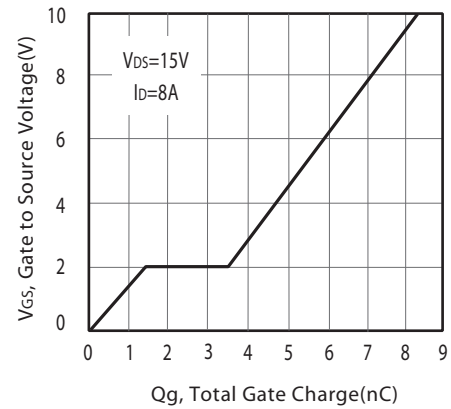


Figure 10. Gate Charge

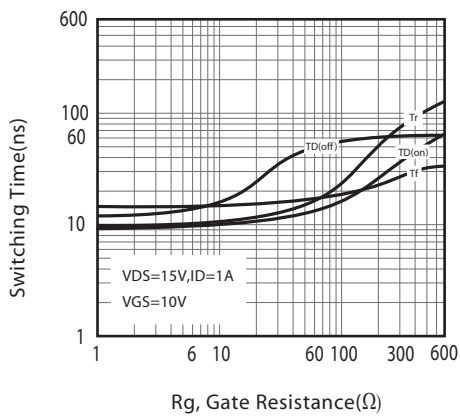


Figure 11. switching characteristics

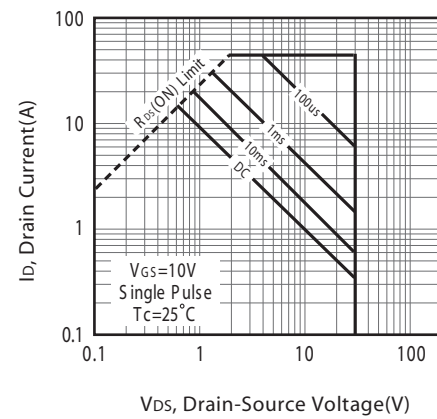
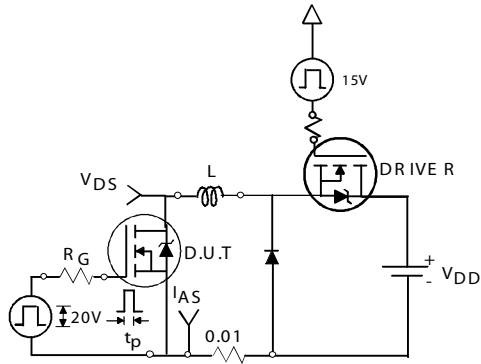
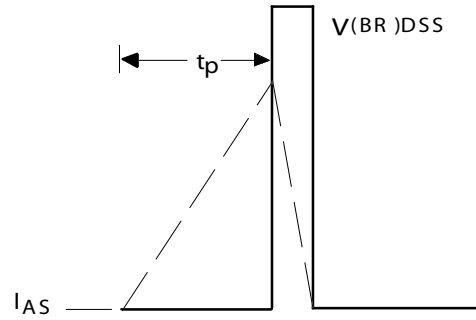


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

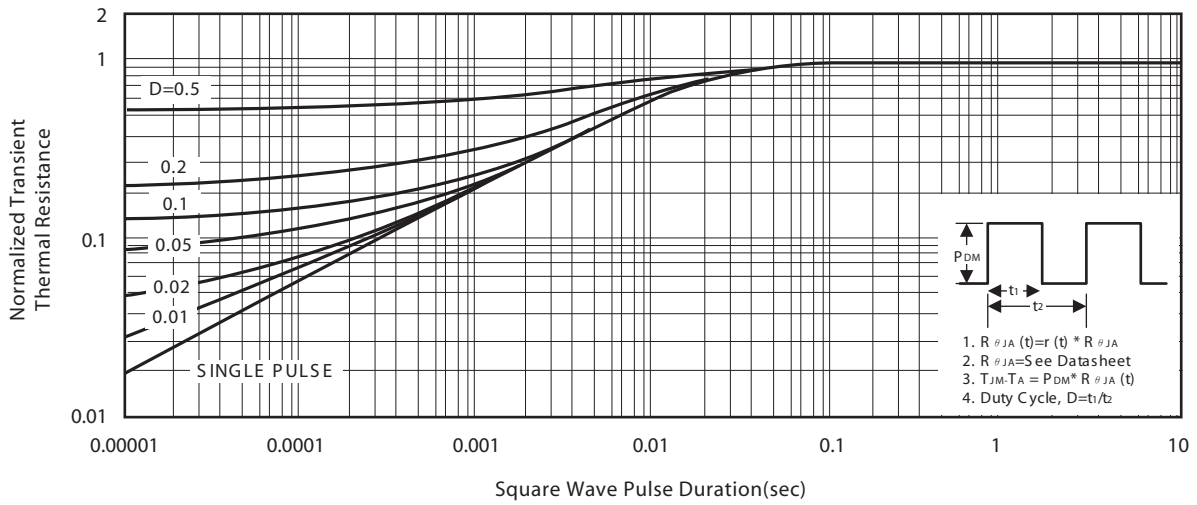


Figure 14. Normalized Thermal Transient Impedance Curve

P-Channel

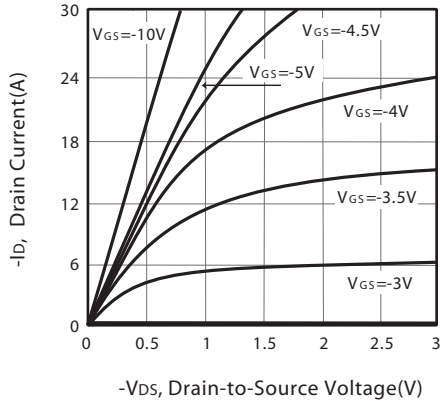


Figure 1. Output Characteristics

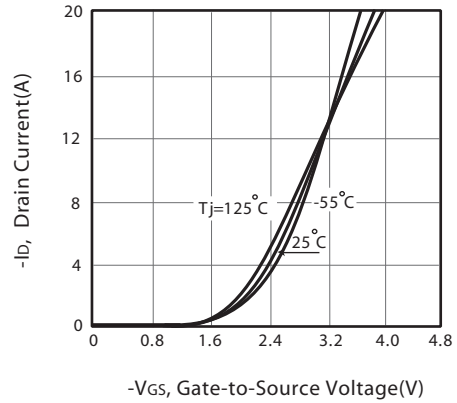


Figure 2. Transfer Characteristics

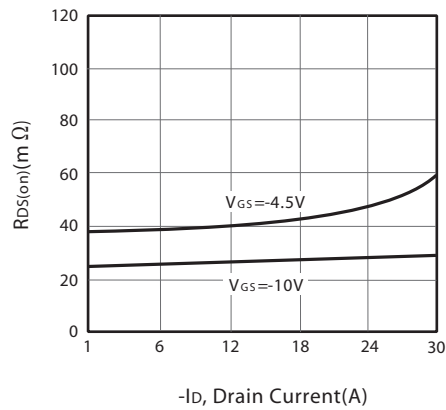


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

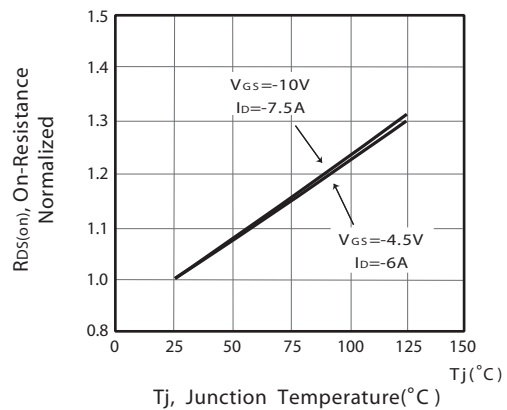


Figure 4. On-Resistance Variation with Drain Current and Temperature

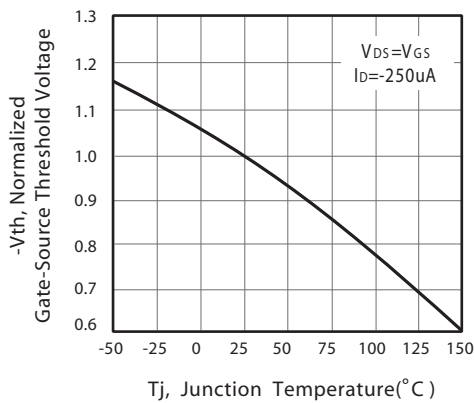


Figure 5. Gate Threshold Variation with Temperature

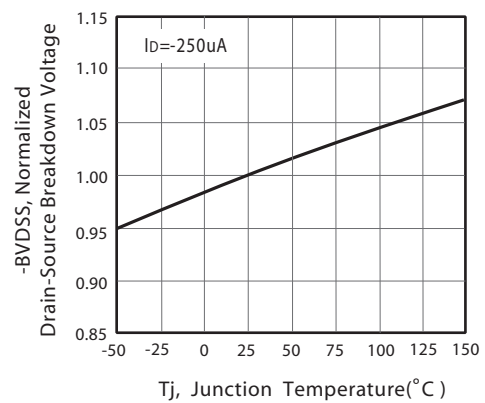


Figure 6. Breakdown Voltage Variation with Temperature

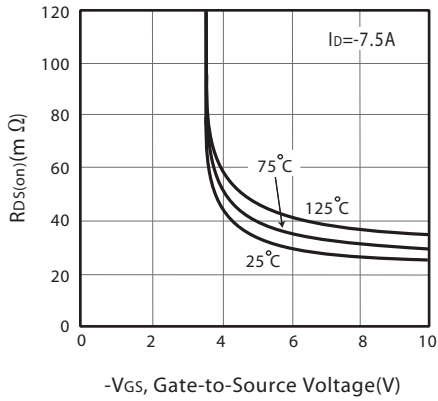


Figure 7. On-Resistance vs. Gate-Source Voltage

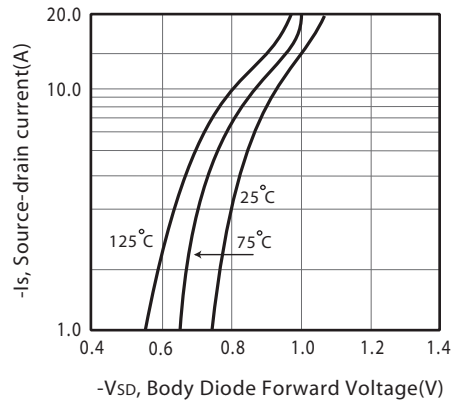


Figure 8. Body Diode Forward Voltage Variation with Source Current

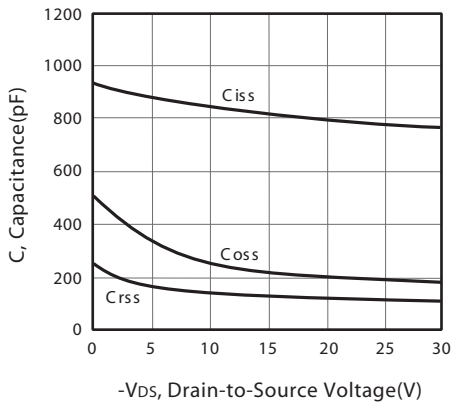


Figure 9. Capacitance

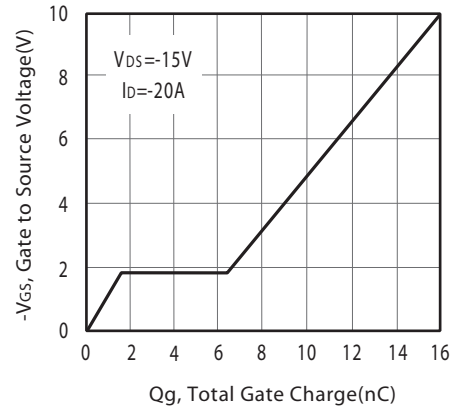


Figure 10. Gate Charge

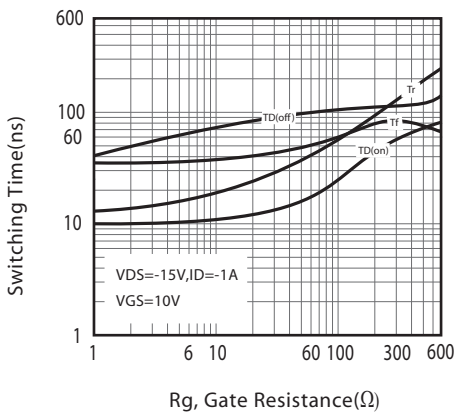


Figure 11. switching characteristics

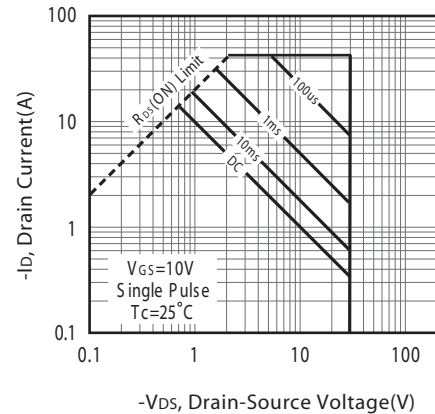
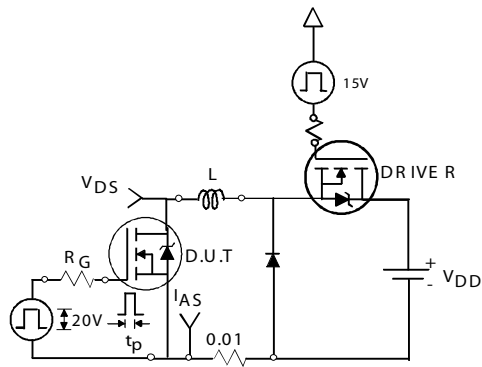
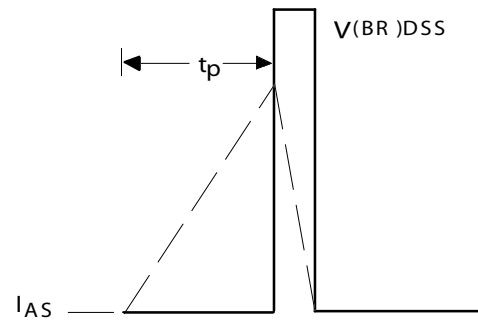


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

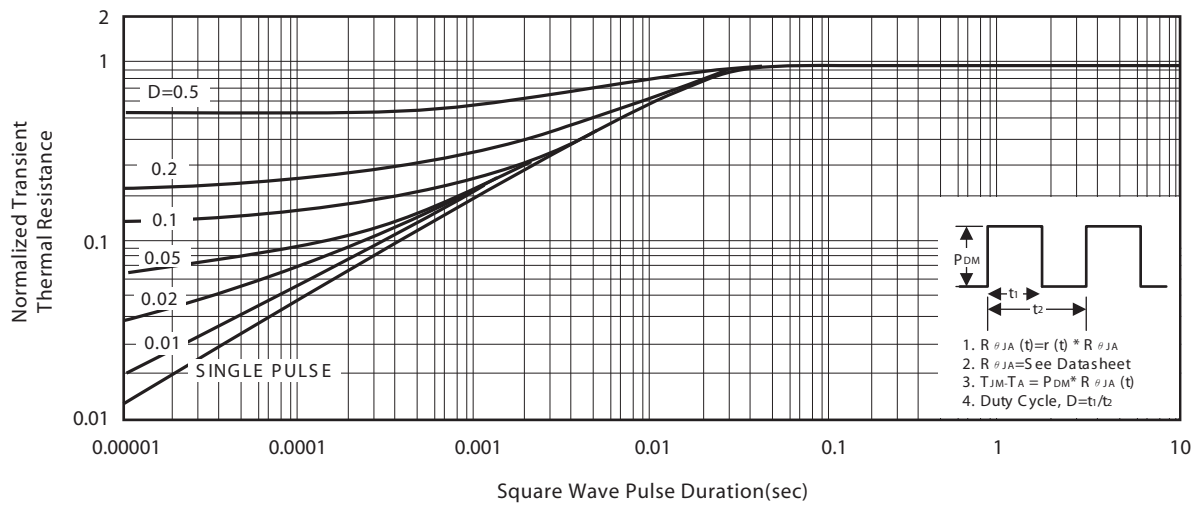
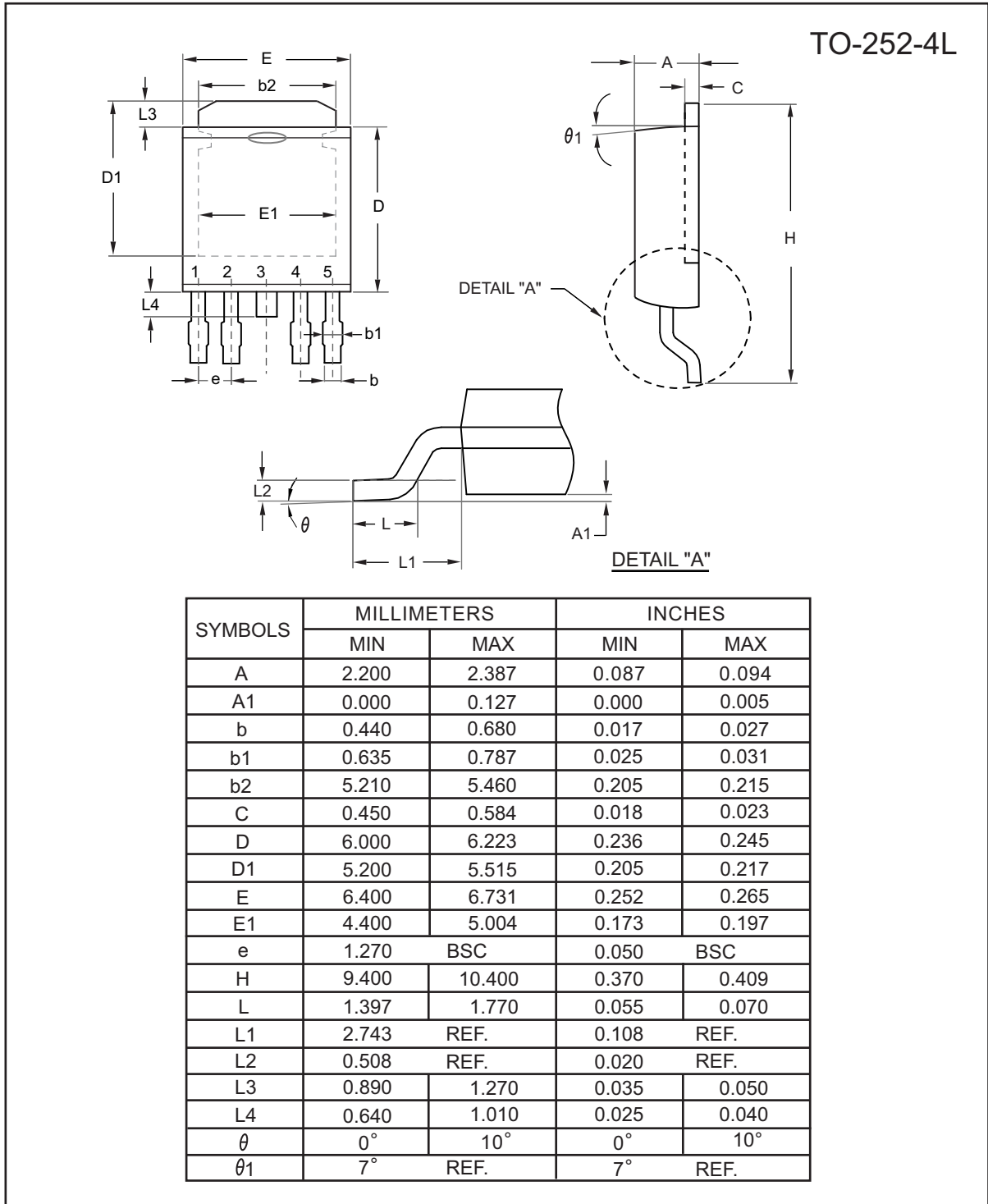


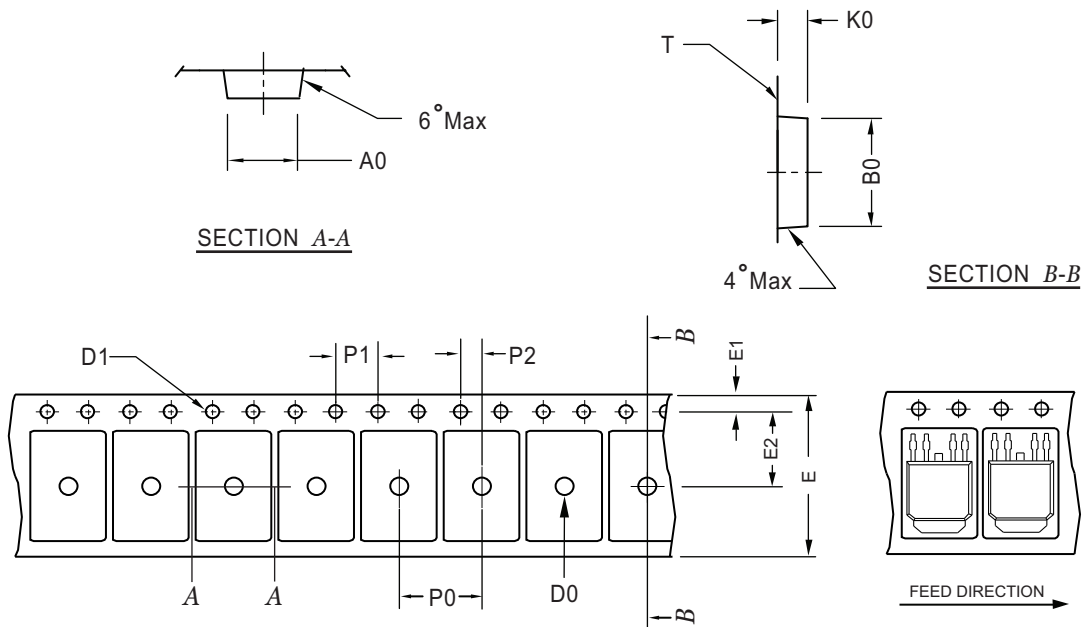
Figure 14. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS



TO-252-4L Tape and Reel Data

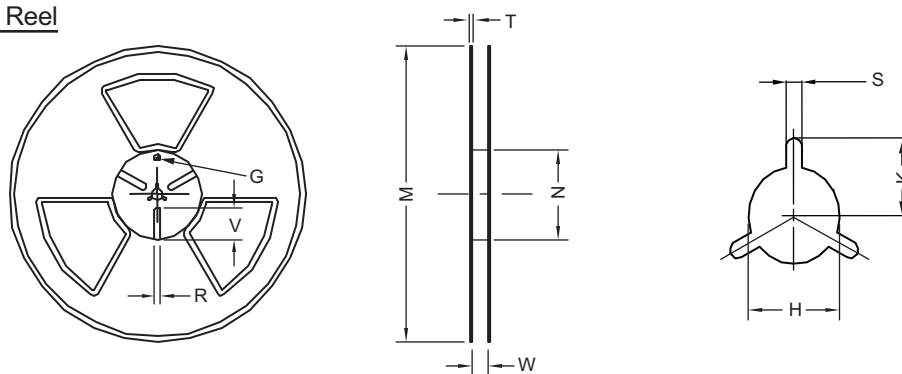
TO-252-4L Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 mm)	6.96 ±0.1	10.49 ±0.1	2.79 ±0.1	φ2	φ 1.5 +0.1 - 0	16.0 ±0.3	1.75 ±0.1	7.5 ±0.15	8.0 ±0.1	4.0 ±0.1	2.0 ±0.15	0.3 ±0.05

TO-252-4L Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 mm	φ 330	φ 330 ± 0.5	φ 97 ± 1.0	17.0 + 1.5 - 0	2.2	φ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---