



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

PRODUCT SUMMARY (N-Channel)		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Typ
55V	4.6A	46 @ V <sub>GS</sub> =10V
		56 @ V <sub>GS</sub> =4.5V

PRODUCT SUMMARY (P-Channel)		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Typ
-55V	-3.5A	85 @ V <sub>GS</sub> =-10V
		105 @ V <sub>GS</sub> =-4.5V



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units	
V <sub>spike</sub> <sup>d</sup>	Drain-Source Voltage Rating	60	-60	V	
V <sub>DS</sub>	Drain-Source Voltage	55	-55	V	
V <sub>GS</sub>	Gate-Source Voltage	±20	±20	V	
I <sub>D</sub>	Drain Current-Continuous <sup>a</sup>	T <sub>A</sub> =25°C	4.6	-3.5	A
		T <sub>A</sub> =70°C	3.7	-2.8	A
I <sub>DM</sub>	-Pulsed <sup>b</sup>	20	-15	A	
P <sub>D</sub>	Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> =25°C	2	W	
		T <sub>A</sub> =70°C	1.28		
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150		°C	

### THERMAL CHARACTERISTICS

R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient <sup>a</sup>	62.5	°C/W
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## N-Channel ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	55			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =44V, V <sub>GS</sub> =0V			1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	nA
<b>ON CHARACTERISTICS</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0	1.9	3.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =4.6A		46	56	m ohm
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		56	75	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =4.6A		9		S
<b>DYNAMIC CHARACTERISTICS</b> °						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V f=1.0MHz		510	590	pF
C <sub>OSS</sub>	Output Capacitance			67	78	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			40	50	pF
<b>SWITCHING CHARACTERISTICS</b> °						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>GEN</sub> =6 ohm		5.5	6.5	ns
t <sub>r</sub>	Rise Time			9.4	13	ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			11.7	13.8	ns
t <sub>f</sub>	Fall Time			4.4	5.1	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =4.6A, V <sub>GS</sub> =10V		11.9	14	nC
		V <sub>DS</sub> =30V, I <sub>D</sub> =4.6A, V <sub>GS</sub> =4.5V		6.1	7.1	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =4.6A, V <sub>GS</sub> =4.5V		1.8	2.2	nC
Q <sub>gd</sub>	Gate-Drain Charge			2.8	3.3	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current				1.3	A
V <sub>SD</sub>	Diode Forward Voltage <sup>b</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1.3A		0.8	1.2	V

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-55			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-44V, V <sub>GS</sub> =0V			-1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	nA
<b>ON CHARACTERISTICS</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1.0	-1.9	-3.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-3.5A		85	105	m ohm
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.9A		105	145	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-3.5A		7.8		S
<b>DYNAMIC CHARACTERISTICS</b> °						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V f=1.0MHz		830	960	pF
C <sub>OSS</sub>	Output Capacitance			75	87	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			45	52	pF
<b>SWITCHING CHARACTERISTICS</b> °						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-30V I <sub>D</sub> =-1A V <sub>GS</sub> =-10V R <sub>GEN</sub> =6 ohm		6.5	7.7	ns
t <sub>r</sub>	Rise Time			14.3	17	ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			43.2	51	ns
t <sub>f</sub>	Fall Time			17.7	21	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-30V, I <sub>D</sub> =-3.5A, V <sub>GS</sub> =-10V		15.5	17.8	nC
		V <sub>DS</sub> =-30V, I <sub>D</sub> =-3.5A, V <sub>GS</sub> =-4.5V		7.1	8.2	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =-30V, I <sub>D</sub> =-3.5A,		2.4	2.8	nC
Q <sub>gd</sub>	Gate-Drain Charge	V <sub>GS</sub> =-4.5V		3.2	3.8	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current				-1.3	A
V <sub>SD</sub>	Diode Forward Voltage <sup>b</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1.3A		-0.79	-1.2	V

### Notes

- Surface Mounted on FR4 Board, t ≤ 10sec.
- Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.
- Guaranteed when external R<sub>g</sub>=6 ohm and t<sub>f</sub> < t<sub>f</sub> max.

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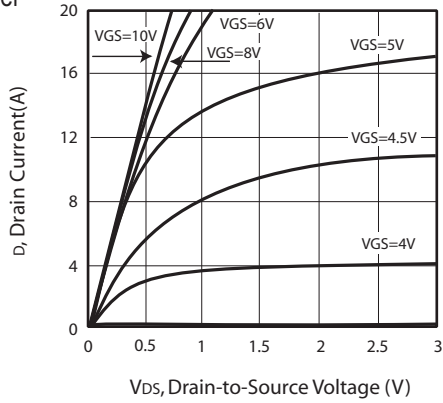


Figure 1. Output Characteristics

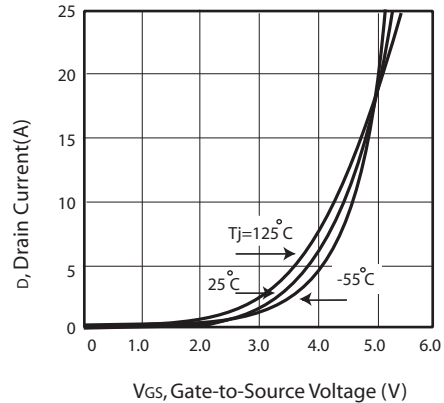


Figure 2. Transfer Characteristics

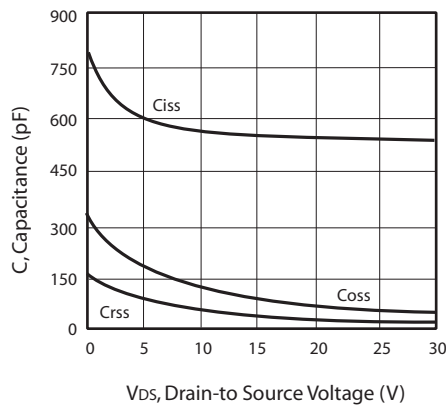


Figure 3. Capacitance

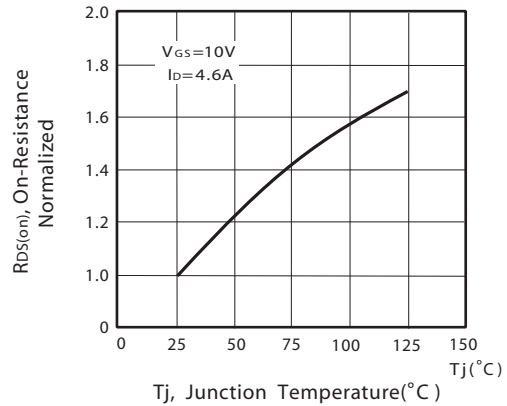


Figure 4. On-Resistance Variation with Drain Current and Temperature

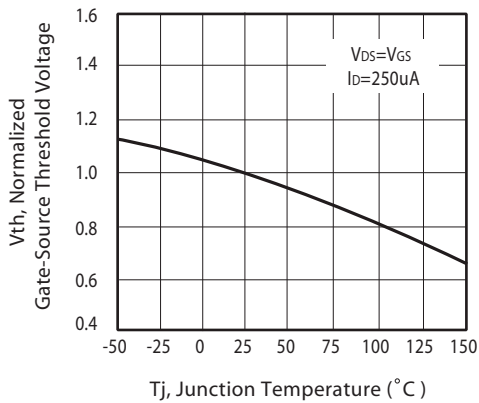


Figure 5. Gate Threshold Variation with Temperature

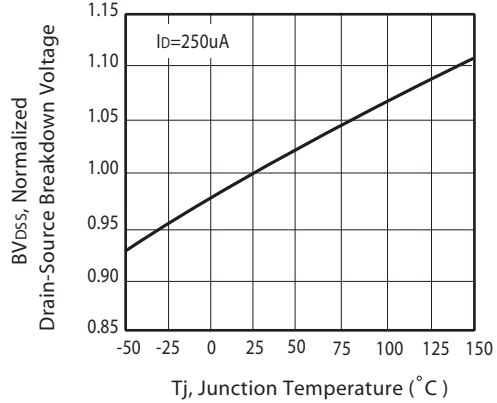


Figure 6. Breakdown Voltage Variation

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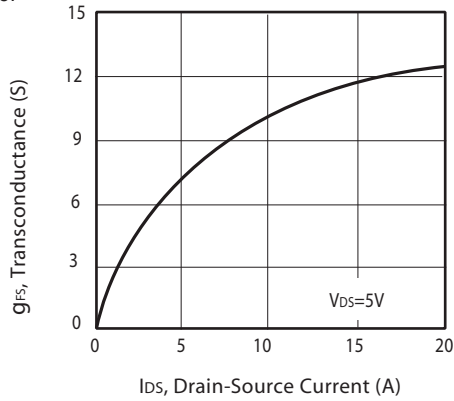


Figure 7. Transconductance Variation with Drain Current

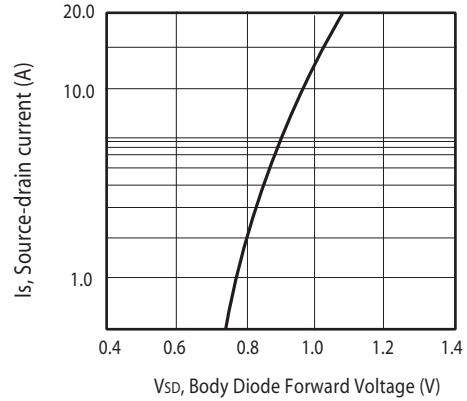


Figure 8. Body Diode Forward Voltage Variation with Source Current

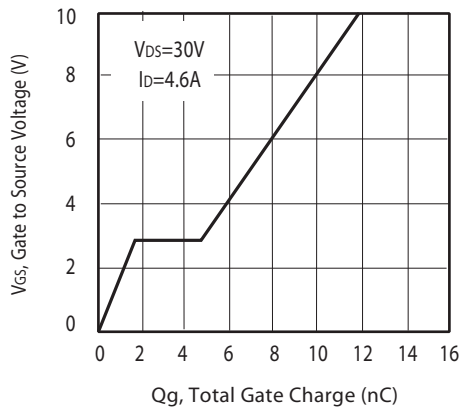


Figure 9. Gate Charge

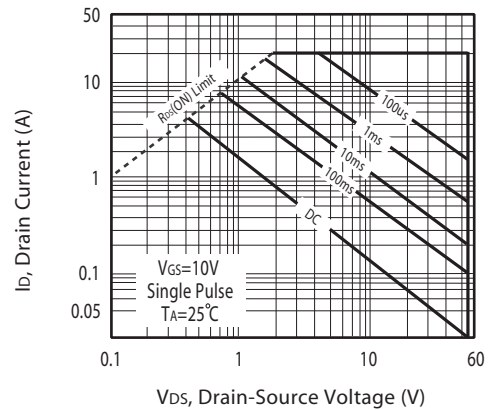
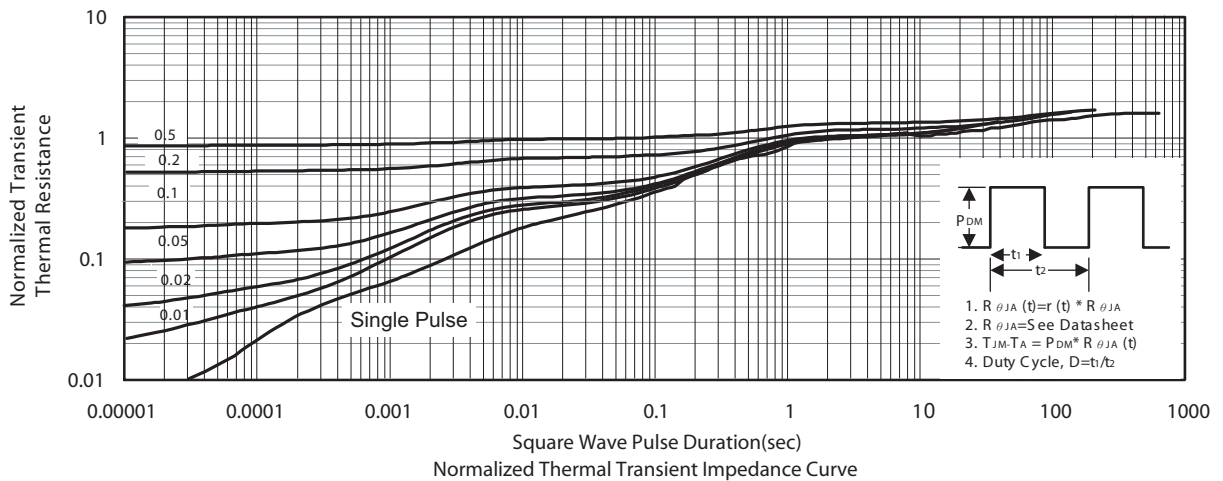


Figure 10. Maximum Safe Operating Area



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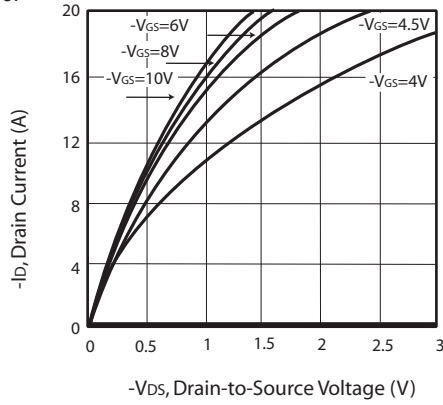


Figure 1. Output Characteristics

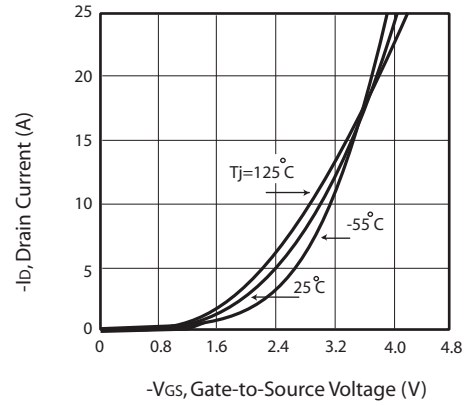


Figure 2. Transfer Characteristics

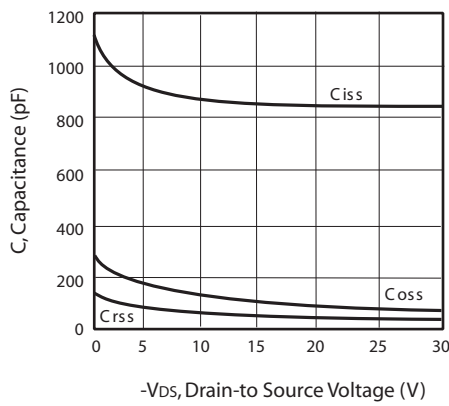


Figure 3. Capacitance

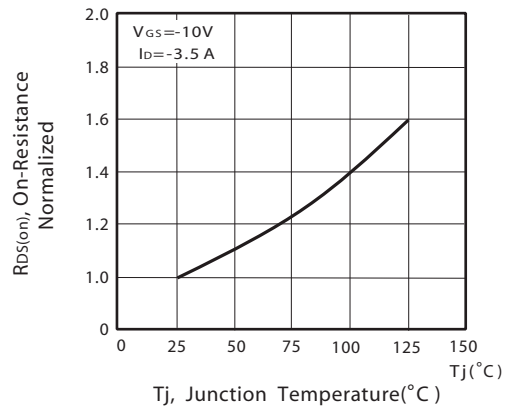


Figure 4. On-Resistance Variation with Drain Current and Temperature

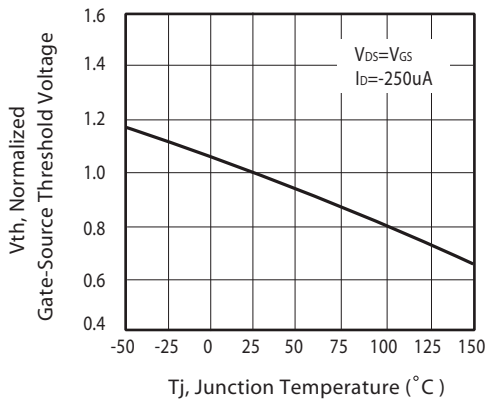


Figure 5. Gate Threshold Variation with Temperature

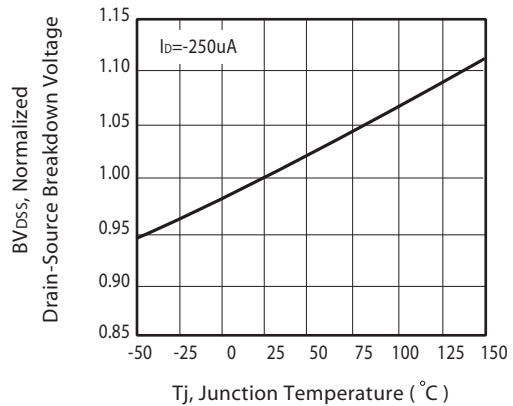


Figure 6. Breakdown Voltage Variation with Temperature

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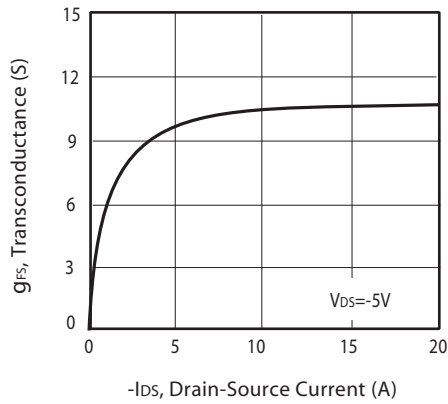


Figure 7. Transconductance Variation with Drain Current

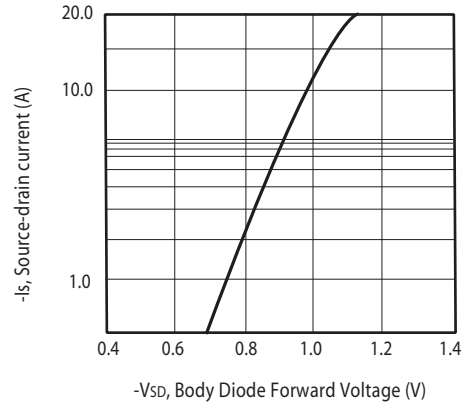


Figure 8. Body Diode Forward Voltage Variation with Source Current

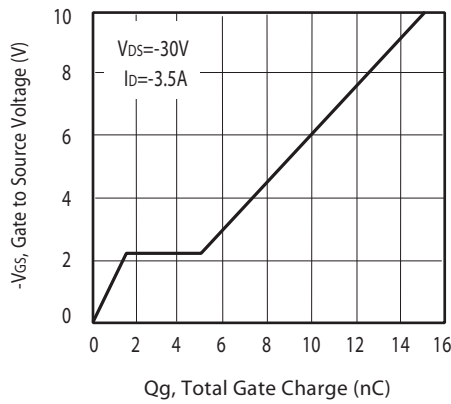


Figure 9. Gate Charge

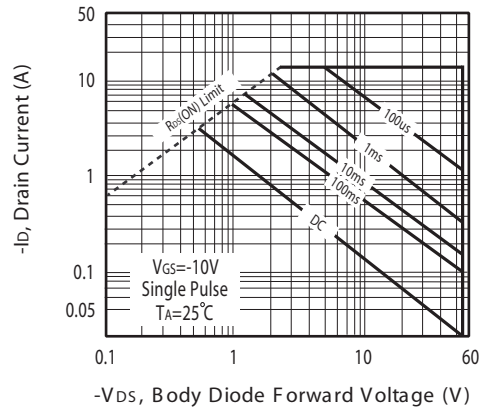
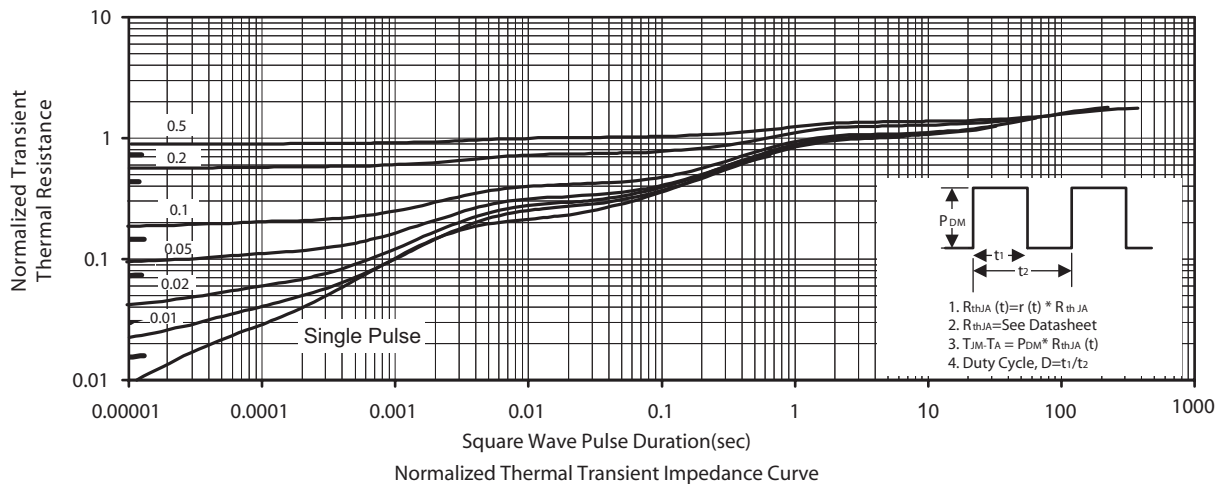


Figure 10. Maximum Safe Operating Area

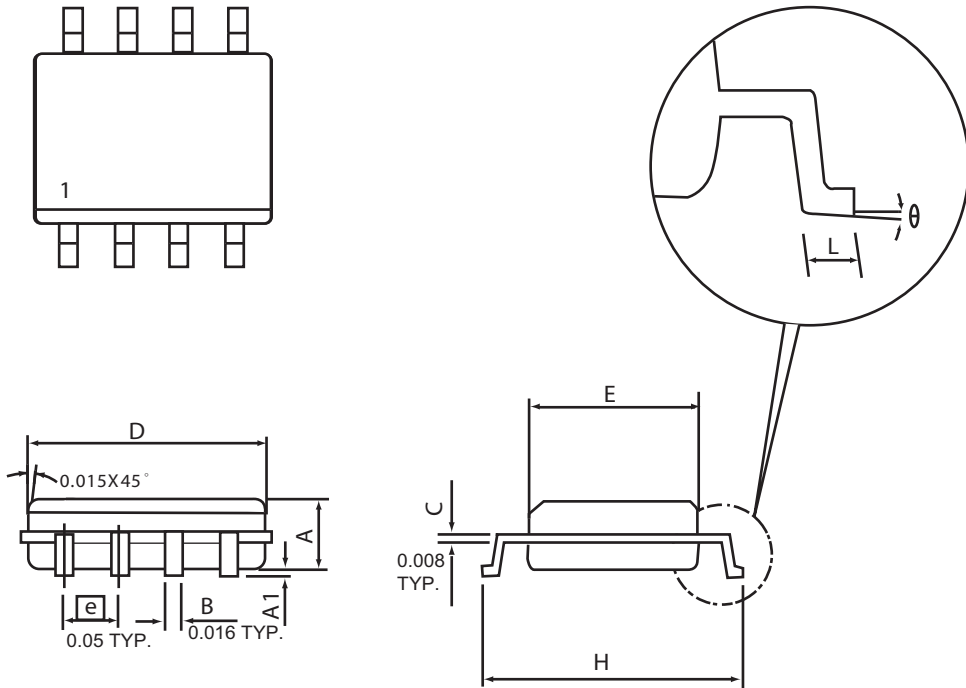


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## PACKAGE OUTLINE DIMENSIONS

SO-8

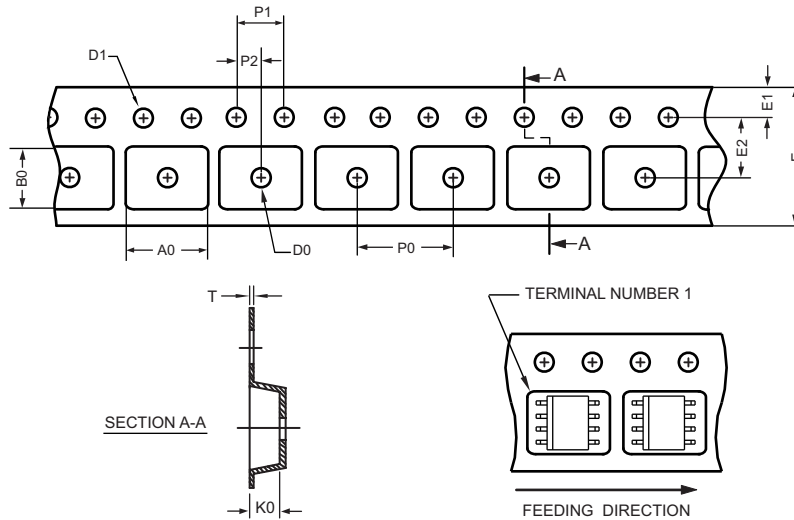


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°



## SO-8 Tape and Reel Data

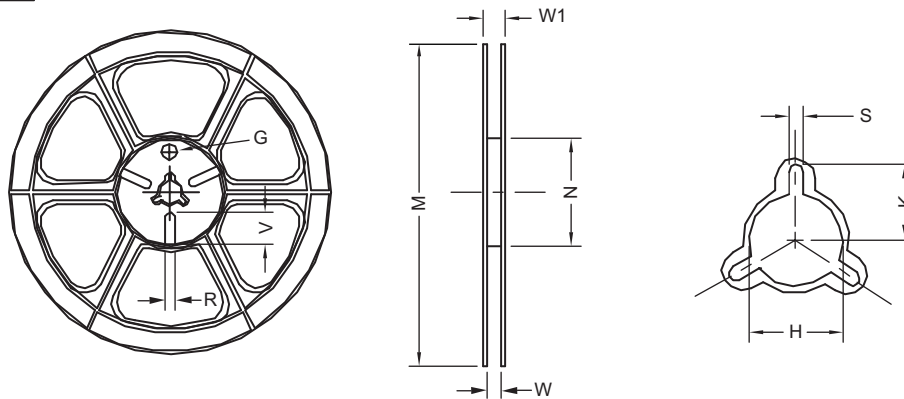
### SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.50 $\pm 0.15$	5.25 $\pm 0.10$	2.10 $\pm 0.10$	$\phi$ 1.5 (MIN)	$\phi$ 1.55 $\pm 0.10$	12.0 +0.3 -0.1	1.75 $\pm 0.10$	5.5 $\pm 0.10$	8.0 $\pm 0.10$	4.0 $\pm 0.10$	2.0 $\pm 0.10$	0.30 $\pm 0.013$

### SO-8 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	$\phi$ 330	330 $\pm 1$	62 $\pm 1.5$	12.4 +0.2	16.8 -0.4	$\phi$ 12.75 +0.15	---	2.0 $\pm 0.15$	---	---	---