

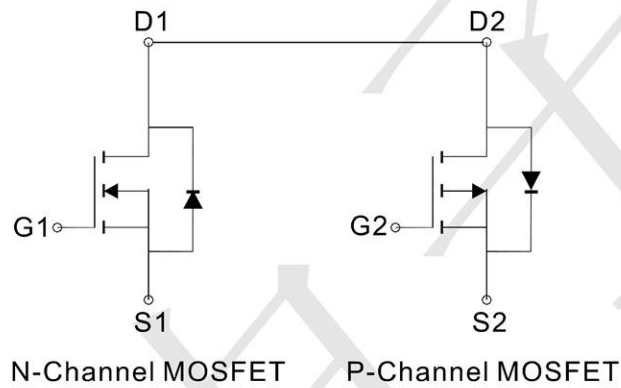
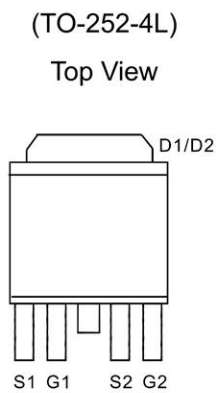
**FEATURES**

- $R_{DS(ON)} \leq 17m\Omega @ V_{GS}=10V$  (N-Ch)
- $R_{DS(ON)} \leq 58m\Omega @ V_{GS}=4.5V$  (N-Ch)
- $R_{DS(ON)} \leq 32m\Omega @ V_{GS}=-10V$  (P-Ch)
- $R_{DS(ON)} \leq 75m\Omega @ V_{GS}=-4.5V$  (P-Ch)

**Application**

- Motor/Body Load Control
- Load Switch
- PWM Application
- DC-DC converters and Off-line UPS

**PIN CONFIGURATION**



**Marking: 4012**

**Absolute Maximum Ratings (at  $T_a = 25^\circ C$  unless otherwise specified)**

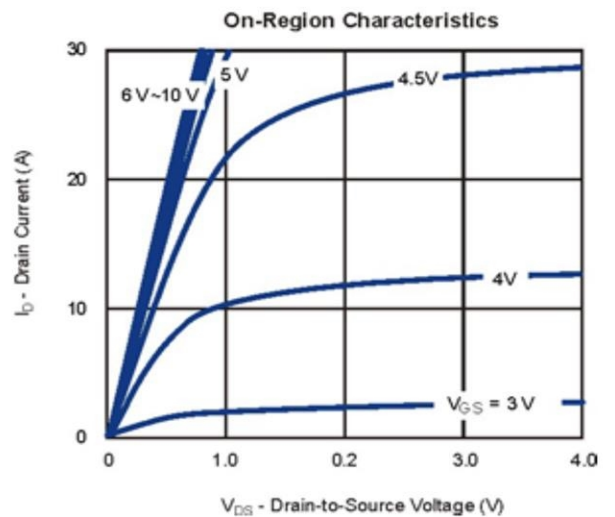
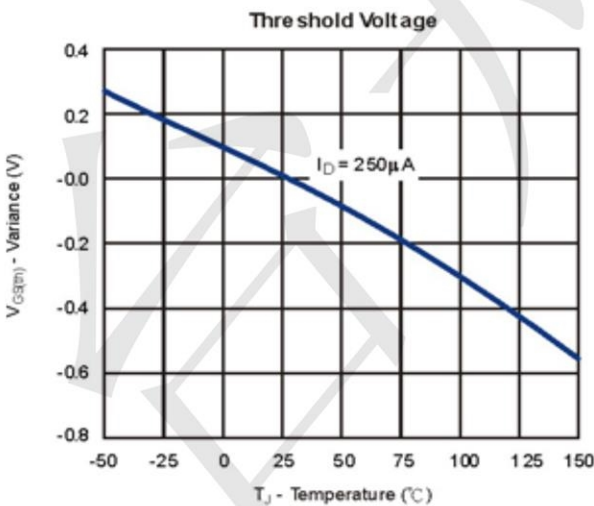
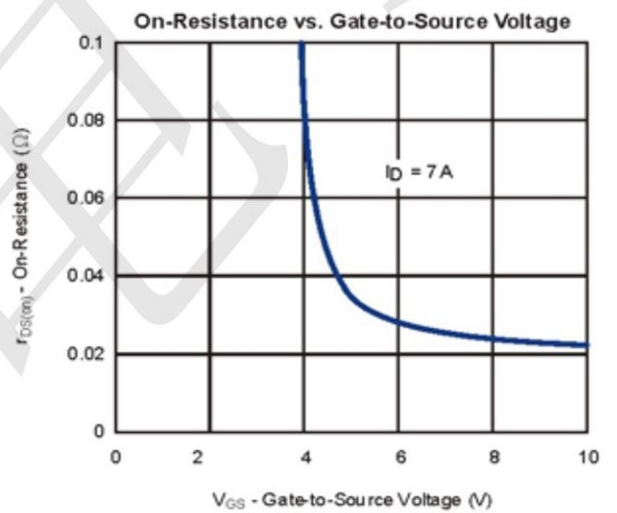
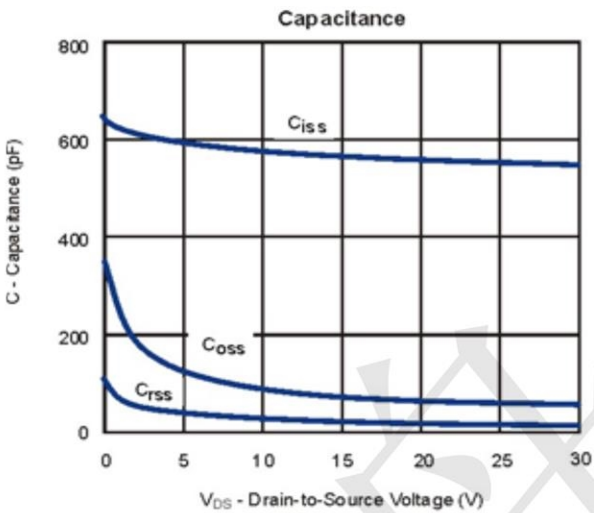
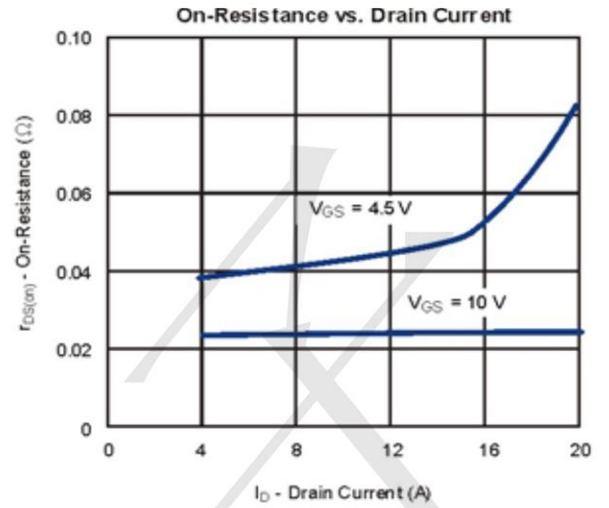
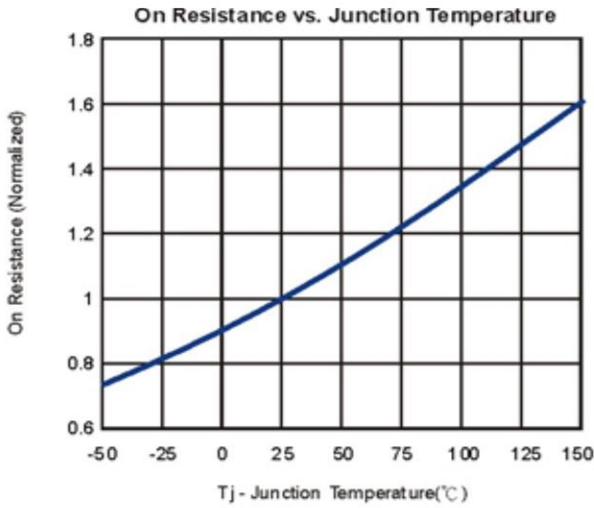
Parameter		Symbol	N-Channel	P-Channel	Unit		
Drain-Source Voltage		$V_{DSS}$	40	-40	V		
Gate-Source Voltage		$V_{GSS}$	$\pm 25$	$\pm 25$	V		
Continuous Drain Current( $T_j=150^\circ C$ )*	$T_c=25^\circ C$	$I_D$	22.1	-18.6	A		
	$T_c=70^\circ C$		17.7	-14.9			
	$T_A=25^\circ C$		7.4	-6.1			
	$T_A=70^\circ C$		5.9	-5			
Pulsed Drain Current		$I_{DM}$	30	-30	A		
Maximum Power Dissipation	$T_A=25^\circ C$	$P_D$	2.6	2.7	W		
	$T_A=70^\circ C$		1.67	1.7			
Operating Junction Temperature		$T_J$	-55 to 150		$^\circ C$		
Thermal Resistance-Junction to Ambient*		$R_{\theta JA}$	Steady	48	Steady	46	$^\circ C/W$
			10sec	20	10sec	18	
Thermal Resistance-Junction to Case*		$R_{\theta JC}$	5.3		5	$^\circ C/W$	

**Electrical Characteristics (at Ta = 25°C unless otherwise specified)**

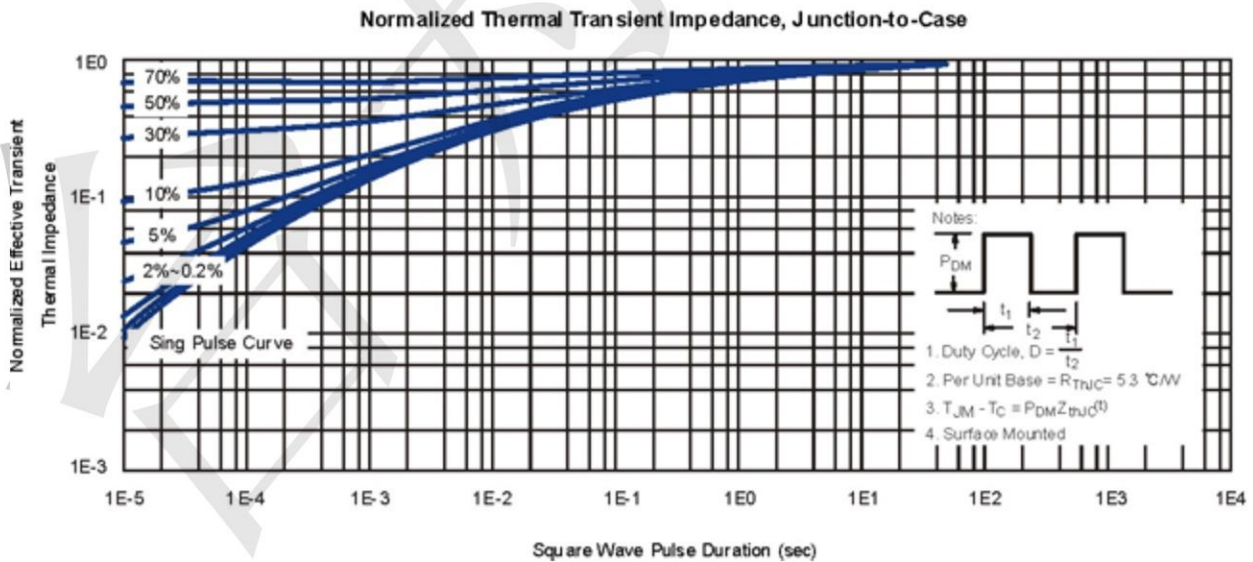
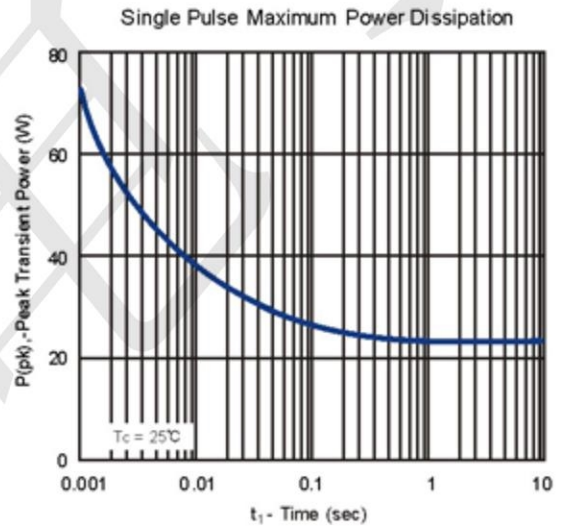
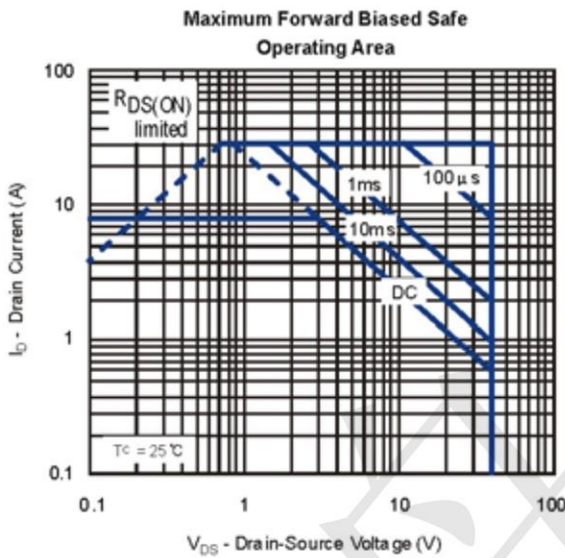
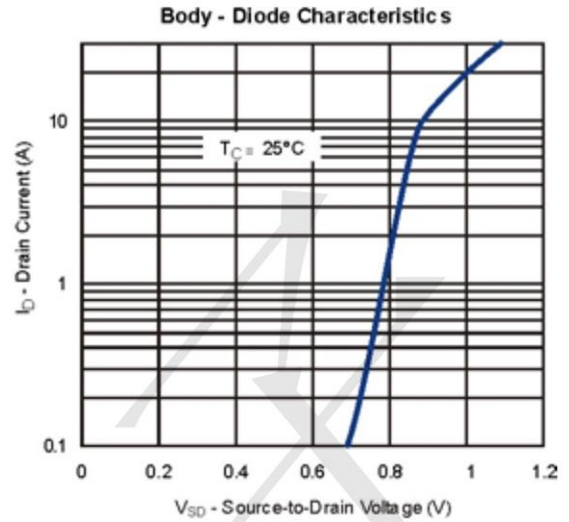
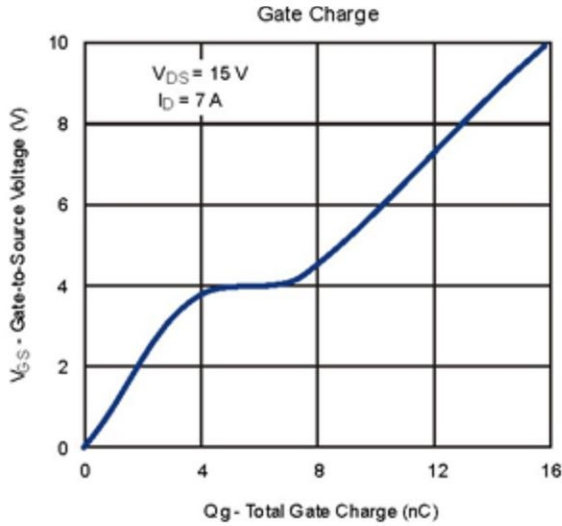
Symbol	Parameter	Limit	Min	Typ	Max	Unit	
<b>STATIC</b>							
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250 μA V <sub>GS</sub> =0V, I <sub>D</sub> =250 μA	N-Ch P-Ch	40 -40		V	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250 μA	N-Ch P-Ch	1 -1	1.5 -1.5	3 -3	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±25V V <sub>DS</sub> =0V, V <sub>GS</sub> =±25V	N-Ch P-Ch			±100 ±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V	N-Ch P-Ch			1 -1	μA
		V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	N-Ch P-Ch			10 -10	
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>a</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> = 7A V <sub>GS</sub> =-10V, I <sub>D</sub> = -7A	N-Ch P-Ch		17 32	30 45	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> = 6A V <sub>GS</sub> =-4.5V, I <sub>D</sub> = -6A	N-Ch P-Ch		42 58	58 75	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V I <sub>S</sub> =-1.7A, V <sub>GS</sub> =0V	N-Ch P-Ch		0.7 -0.7	1.2 -1.2	V
<b>DYNAMIC</b>							
Q <sub>g</sub>	Total Gate Charge	N-Channel V <sub>DS</sub> =20V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A P-Channel V <sub>DS</sub> =-20V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-7A	N-Ch P-Ch		8 10		nC
Q <sub>gs</sub>	Gate-Source Charge		N-Ch P-Ch		4 4.3		
Q <sub>gd</sub>	Gate-Drain Charge		N-Ch P-Ch		4 4.5		
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	N-Ch P-Ch		0.7 6		Ω
C <sub>iss</sub>	Input capacitance	N-Channel V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, F=1MHz P-Channel V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, F=1MHz	N-Ch P-Ch		560 860		pF
C <sub>oss</sub>	Output Capacitance		N-Ch P-Ch		72 120		
C <sub>rss</sub>	Reverse Transfer Capacitance		N-Ch P-Ch		18 35		
t <sub>d(on)</sub>	Turn-On Delay Time	N-Channel V <sub>DD</sub> =15V, R <sub>L</sub> =15 Ω I <sub>D</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6 Ω P-Channel V <sub>DD</sub> =-15V, R <sub>L</sub> =15 Ω I <sub>D</sub> =-1A, V <sub>GEN</sub> =-10V, R <sub>G</sub> =6 Ω	N-Ch P-Ch		11 30		ns
t <sub>r</sub>	Turn-On Rise Time		N-Ch P-Ch		13 8.5		
t <sub>d(off)</sub>	Turn-Off Delay Time		N-Ch P-Ch		37 70		
t <sub>f</sub>	Turn-On Fall Time		N-Ch P-Ch		3.5 7		

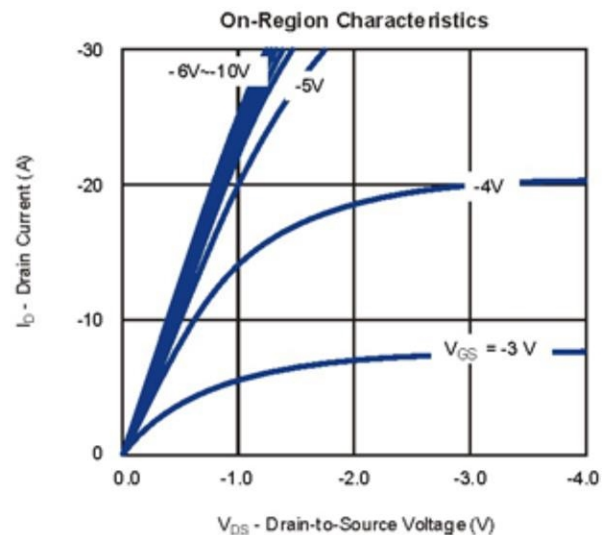
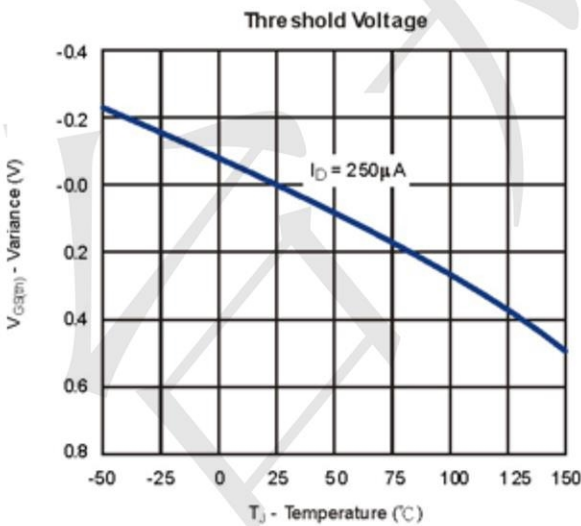
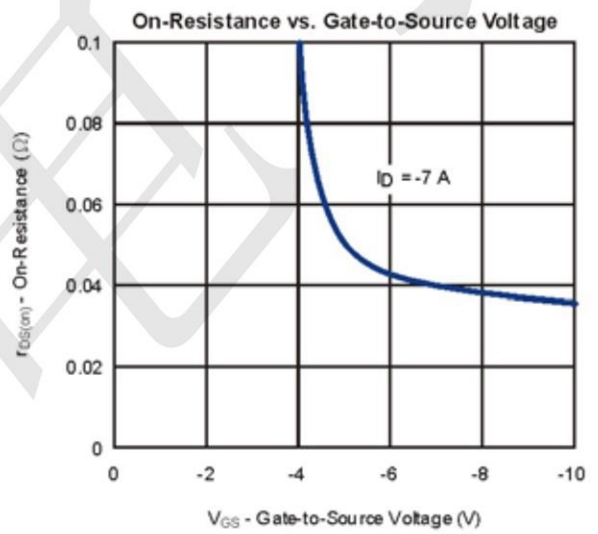
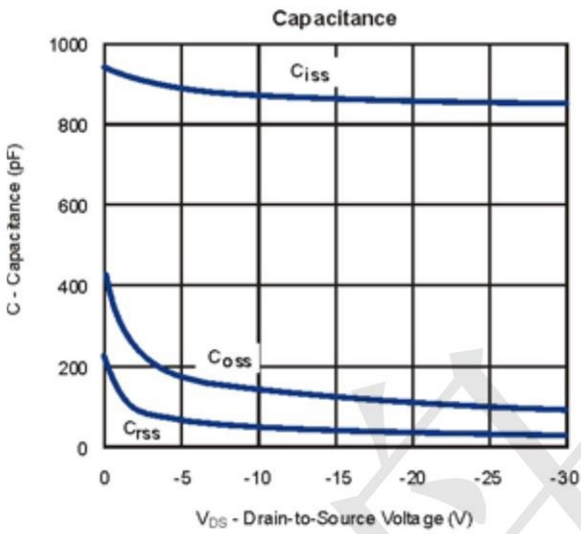
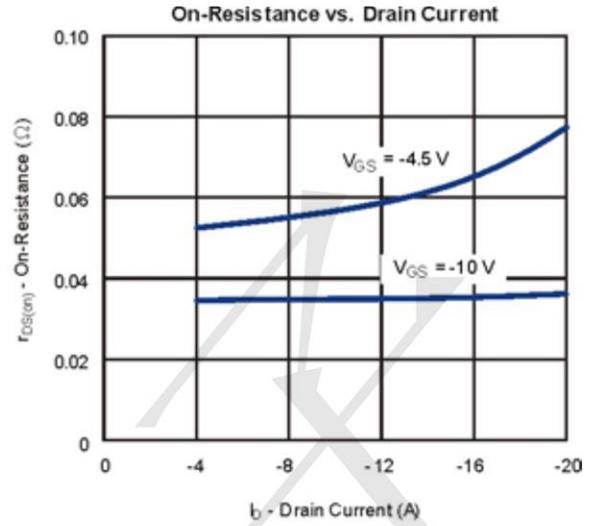
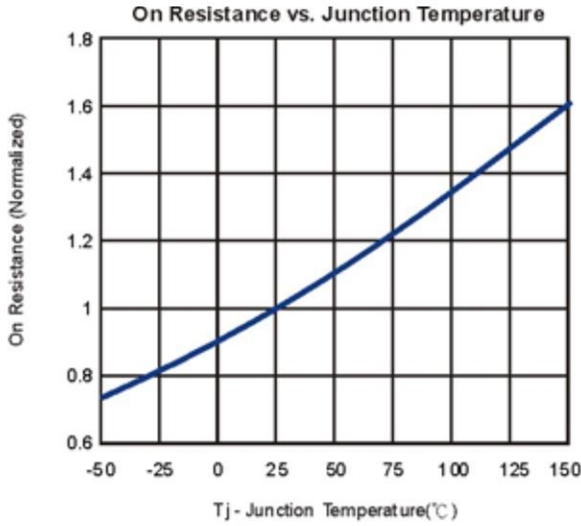
Notes: a. Pulse test; pulse width ≤ 300us, duty cycle ≤ 2%

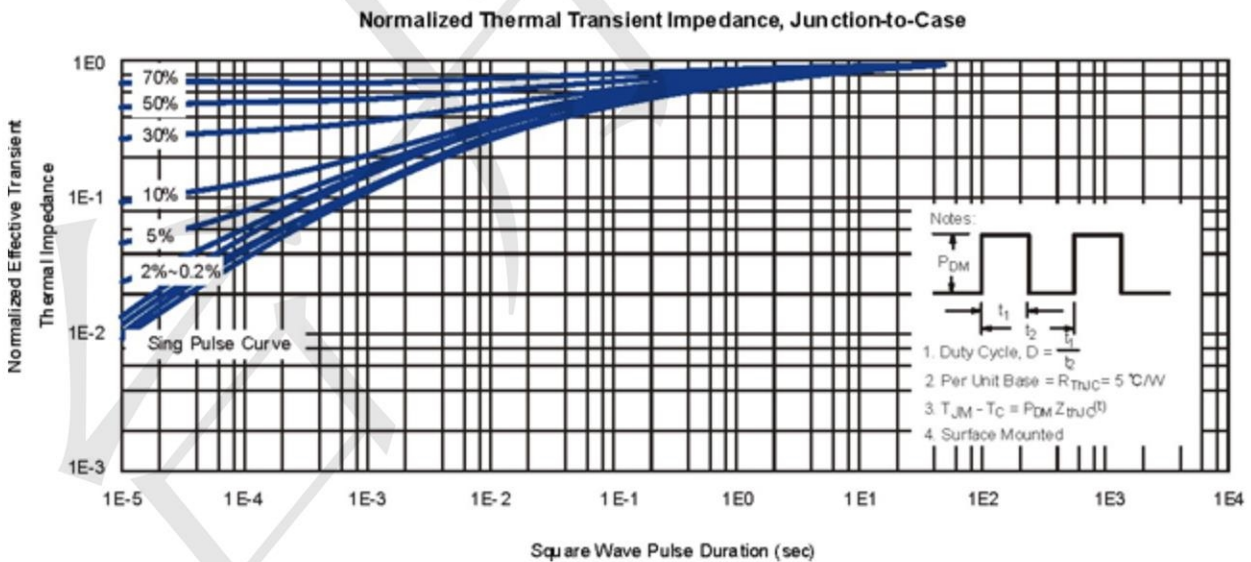
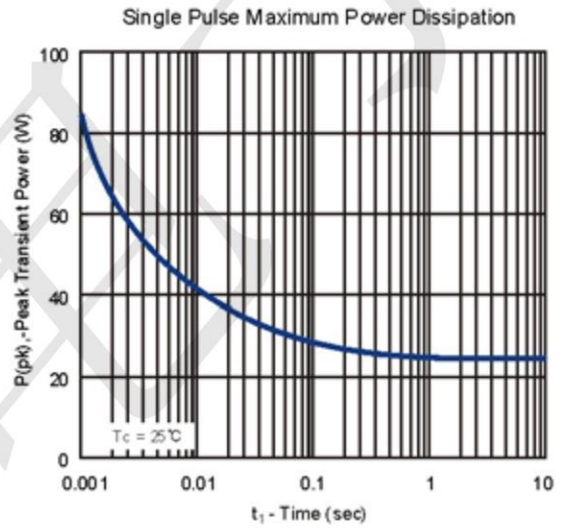
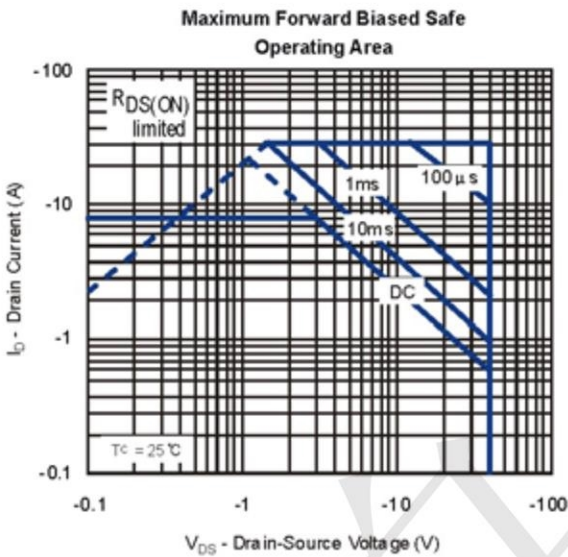
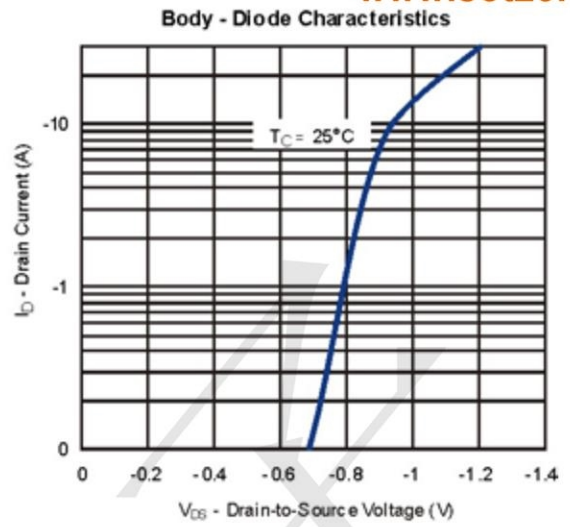
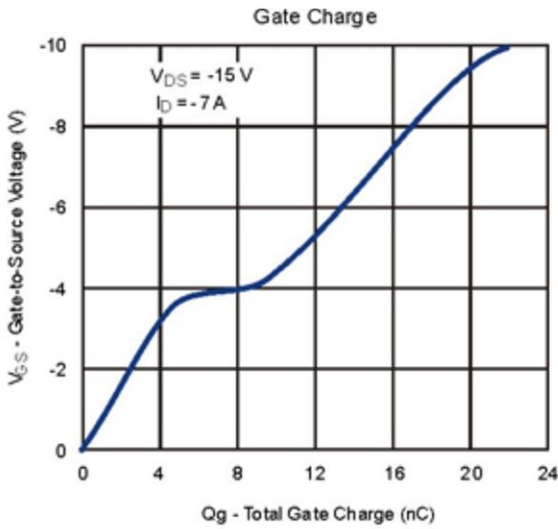
**Typical Characteristics**





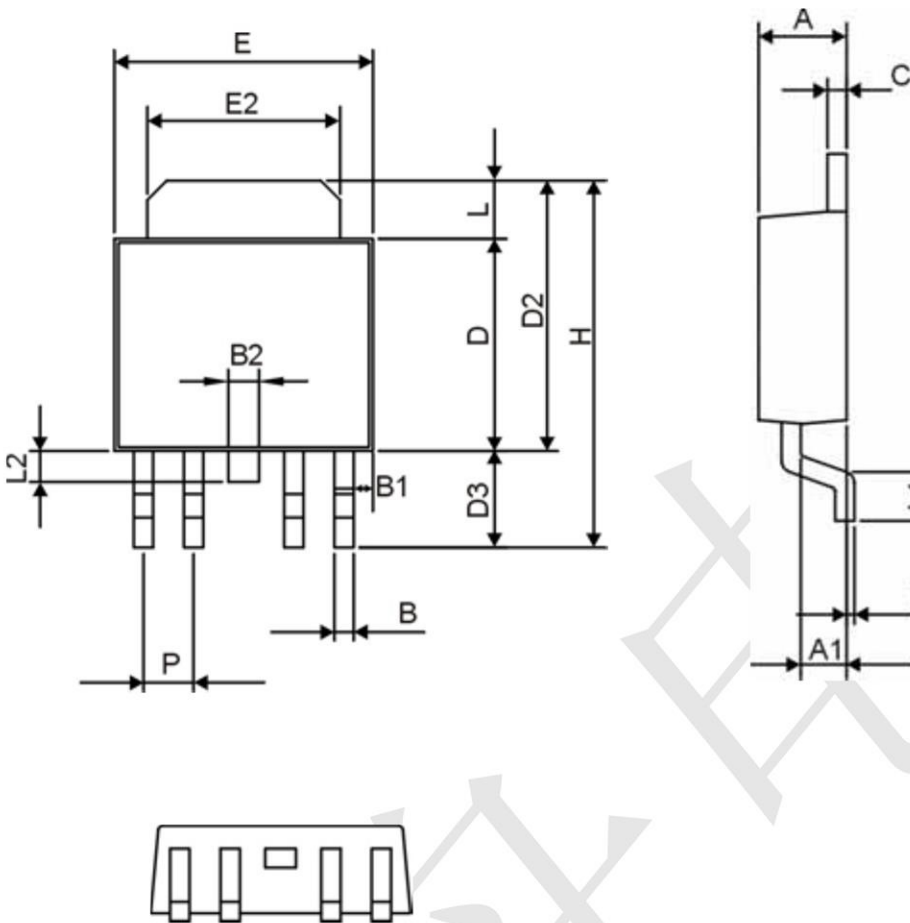








Package Outline Dimensions TO-252-4L Package



DIM	MILLIMETERS (mm)	
	MIN	MAX
A	2.20	2.50
A1	1.10	1.30
B	0.30	0.75
B1	0.55	0.75
B2	0.40	0.80
C	0.40	0.60
D	5.20	5.70
D2	6.50	7.30
D3	2.20	3.00
E	6.30	6.70
E2	4.50	5.50
H	9.50	10.50
L	1.30	1.70
L1	0.90	1.70
L2	0.50	1.10
L3	0.00	0.30
P	1.20	1.40