

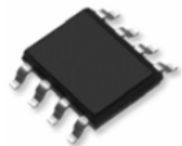
**General Features**

- $V_{DS} = -40V, I_D = 12A$   
 $R_{DS(ON)} < 18m\Omega @ V_{GS}=10V$

**Application**

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

**Package and Pin Configuration**



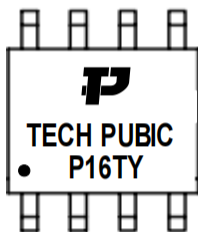
SOP-8 top view



**Circuit diagram**



**Marking**



**Absolute Maximum Ratings ( $T_A=25^\circ C$  unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-12	A
Drain Current-Continuous( $T_C=100^\circ C$ )	$I_D(100^\circ C)$	-9	A
Pulsed Drain Current	$I_{DM}$	50	A
Maximum Power Dissipation	$P_D$	2.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

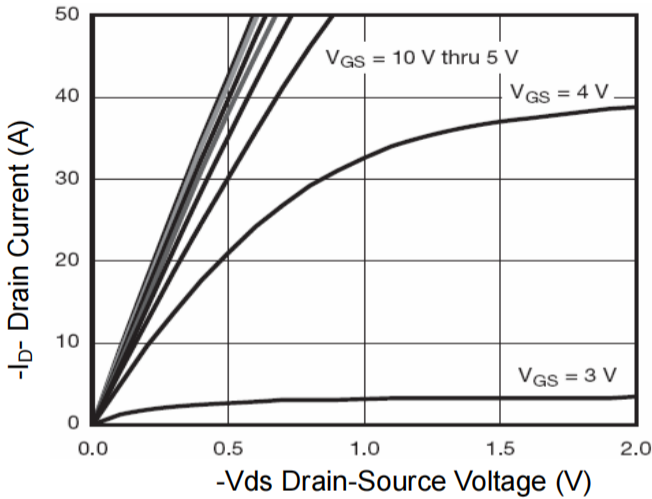
**Thermal Characteristic**

Thermal Resistance ,Junction-to-Ambient(Note 2)	$R_{\theta JA}$	50	$^\circ C/W$
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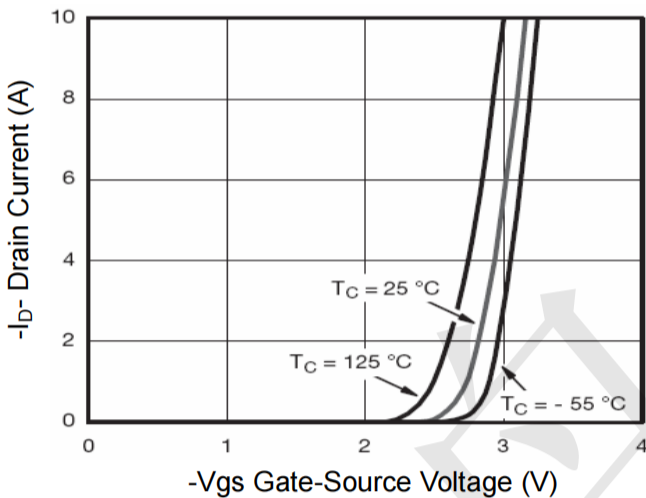
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-40	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0	-	-2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-12A	-	12	18	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-10A	35	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, F=1.0MHz	-	2800	-	PF
Output Capacitance	C <sub>oss</sub>		-	320	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	220	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-20V, R <sub>L</sub> =2Ω V <sub>GS</sub> =-10V, R <sub>GEN</sub> =6Ω	-	11	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	75	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	89	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	35	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-20V, I <sub>D</sub> =-12A, V <sub>GS</sub> =-10V	-	40	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	6	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	12	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-12A	-	-	1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	-12	A

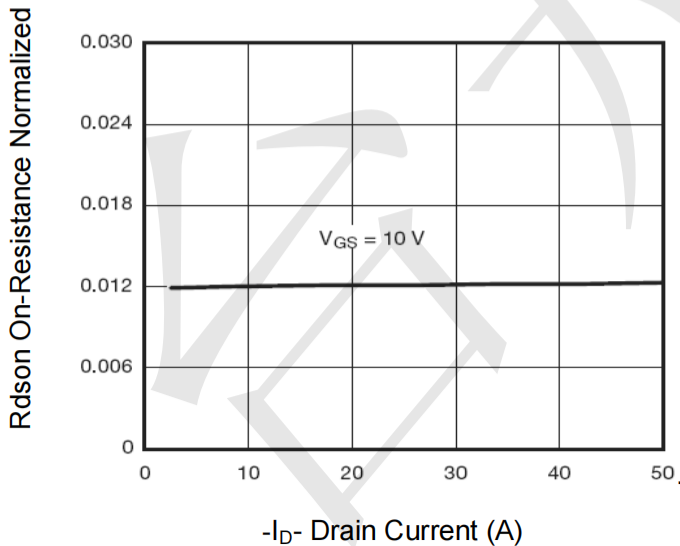
**Typical Electrical and Thermal Characteristics**



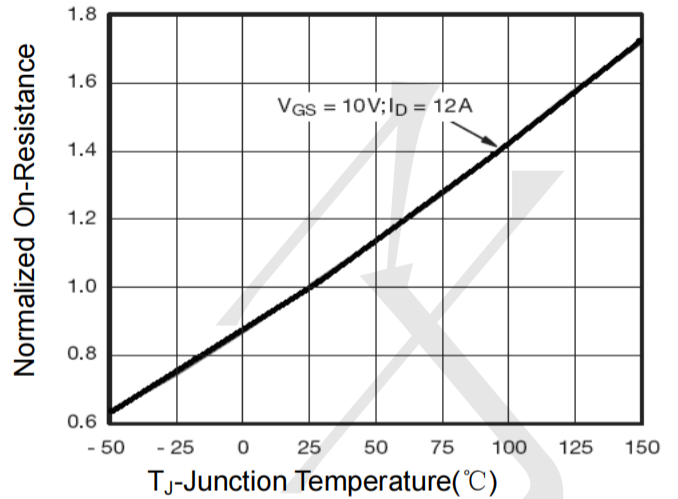
**Figure 1 Output Characteristics**



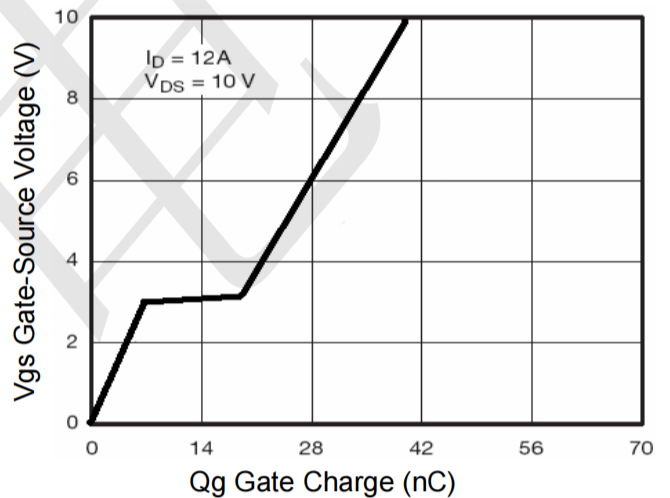
**Figure 2 Transfer Characteristics**



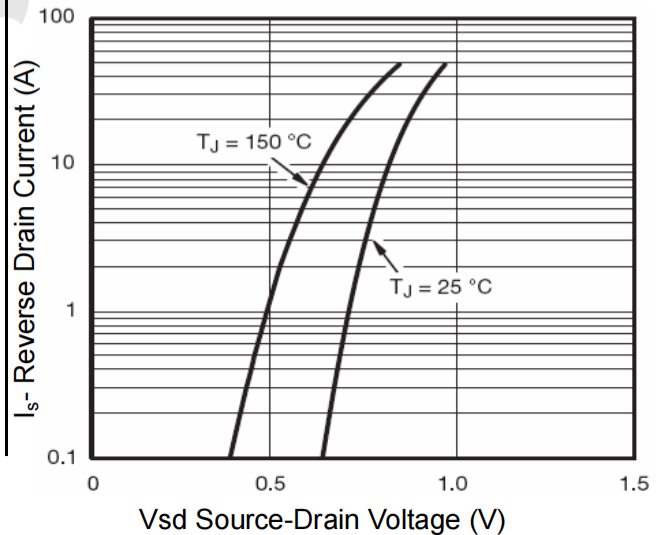
**Figure 3  $R_{DS(on)}$ - Drain Current**



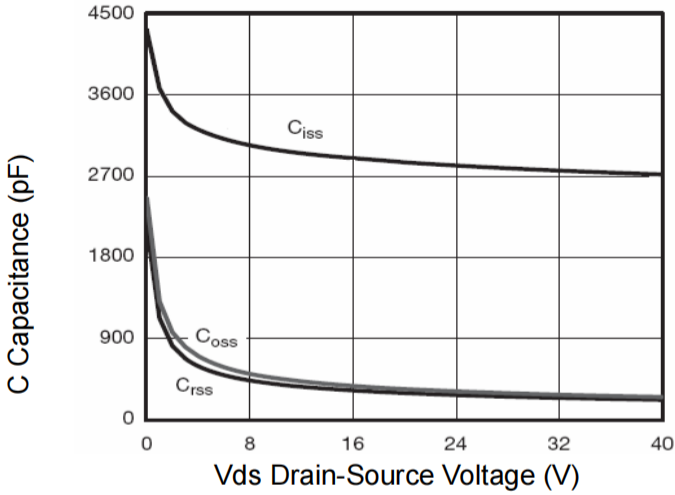
**Figure 4  $R_{DS(on)}$ -Junction Temperature**



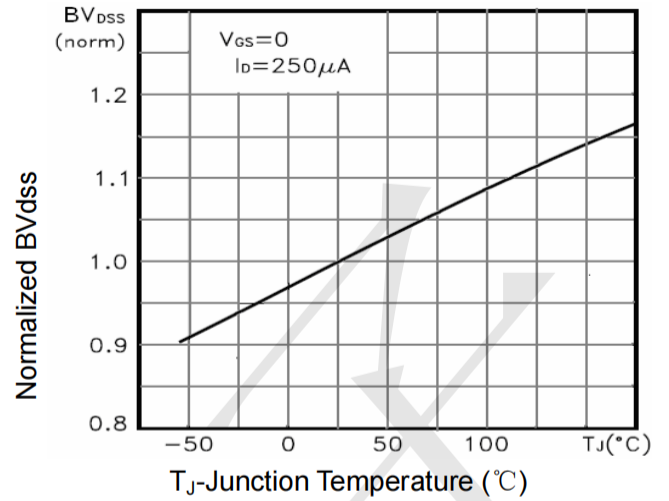
**Figure 5 Gate Charge**



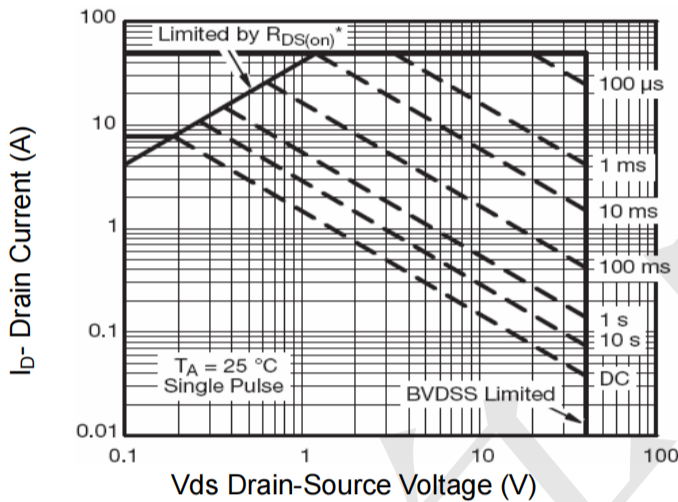
**Figure 6 Source- Drain Diode Forward**



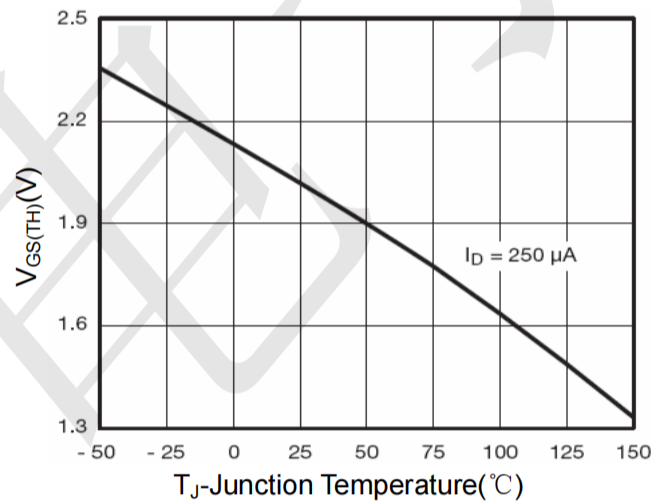
**Figure 7 Capacitance vs Vds**



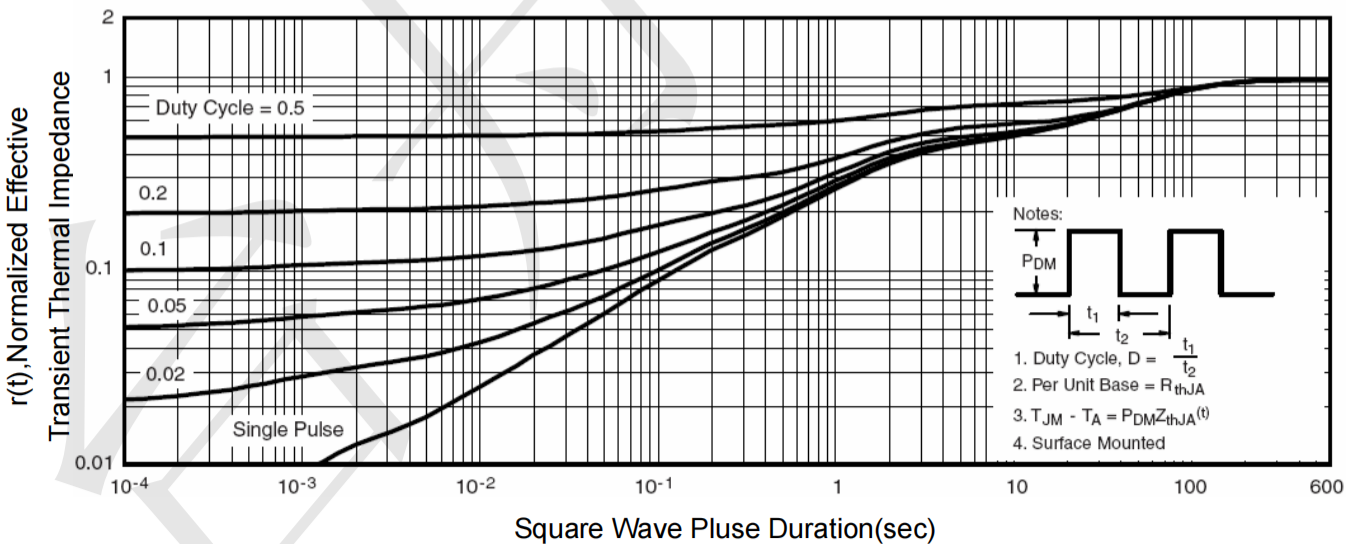
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



**Figure 8 Safe Operation Area**



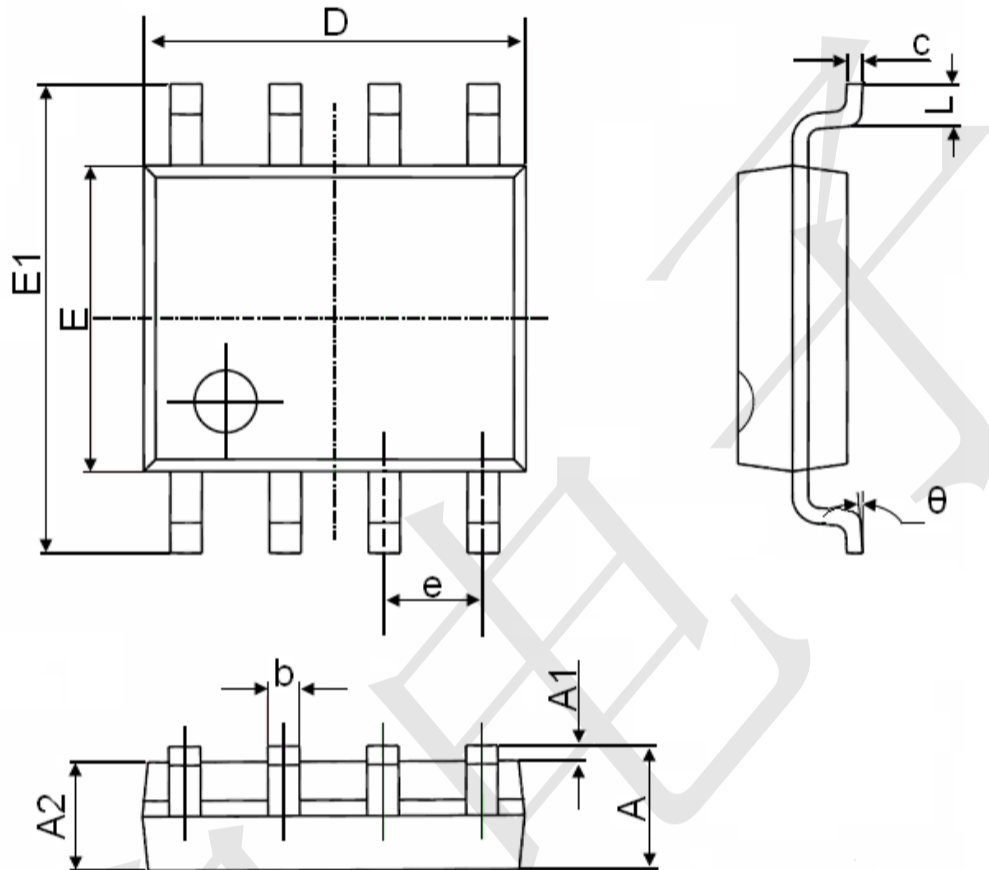
**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**



SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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