

# EVVOSEMI<sup>®</sup>

THINK CHANGE DO



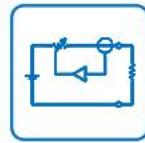
ESD



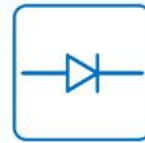
TVS



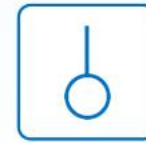
MOS



LDO



Diode



Sensor



DC-DC

## Product Specification

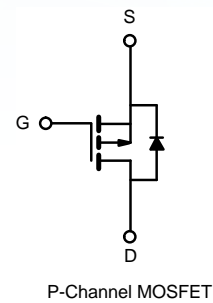
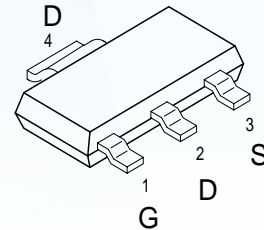
▶ Domestic	Part Number	NTF2955T1G
▶ Overseas	Part Number	NTF2955T1G-EV
▶ Equivalent	Part Number	NTF2955T1G

EV is the abbreviation of name EVVO

## -60V P-Channel MOSFET

### Features

- $V_{DS} (V) = -60V$
- $I_D = -7A (V_{GS} = -10V)$   
 $I_D = -6A (V_{GS} = -4.5V)$
- $R_{DS(ON)} < 55m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 65m\Omega (V_{GS} = -4.5V)$



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	- 60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150\text{ }^\circ\text{C}$ )	$I_D$	$T_C = 25\text{ }^\circ\text{C}$	- 7.0 <sup>a</sup>
		$T_C = 70\text{ }^\circ\text{C}$	- 5.2
		$T_A = 25\text{ }^\circ\text{C}$	- 4.8 <sup>b</sup>
		$T_A = 70\text{ }^\circ\text{C}$	- 4.1 <sup>b</sup>
Pulsed Drain Current	$I_{DM}$	- 25	A
Avalanche Current Pulse	$I_{AS}$	- 4.5	
Single Pulse Avalanche Energy	$E_{AS}$	10.1	
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$	6.9 <sup>a</sup>
		$T_A = 25\text{ }^\circ\text{C}$	3.5 <sup>b</sup>
Maximum Power Dissipation	$P_D$	$T_C = 25\text{ }^\circ\text{C}$	10.4 <sup>a</sup>
		$T_C = 70\text{ }^\circ\text{C}$	6.6 <sup>a</sup>
		$T_A = 25\text{ }^\circ\text{C}$	2.1 <sup>b</sup>
		$T_A = 70\text{ }^\circ\text{C}$	1.1 <sup>b</sup>
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	$^\circ\text{C}$

<b>THERMAL RESISTANCE RATINGS</b>					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	Steady State	$R_{thJA}$	33	40	$^\circ\text{C/W}$
Maximum Junction-to-Case	Steady State	$R_{thJC}$	0.98	1.2	

Notes:

a. Based on  $T_C = 25\text{ }^\circ\text{C}$ .

b. Surface mounted on 1" x 1" FR4 board.

**-60V P-Channel MOSFET**

<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 60			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		68		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.2		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1.0		- 2.5	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	- 25			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3\text{ A}$		55		m $\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -2\text{ A}$		65		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$	20			S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1500		pF
Output Capacitance	$C_{oss}$			200		
Reverse Transfer Capacitance	$C_{rss}$			150		
Total Gate Charge	$Q_g$	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		38	56	nC
				19	30	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -30\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		9		
Gate-Drain Charge	$Q_{gd}$			10		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		5.2		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -2\text{ V}, R_L = 2\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		10	15	ns
Rise Time	$t_r$			7	15	
Turn-Off Delay Time	$t_{d(off)}$			70	110	
Fall Time	$t_f$			40	60	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 6.9	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				- 15	
Body Diode Voltage	$V_{SD}$	$I_S = -3\text{ A}$		- 1	- 1.5	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -5\text{ A}, di/dt = 10\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		45	68	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			59	120	nC
Reverse Recovery Fall Time	$t_a$			29		ns
Reverse Recovery Rise Time	$t_b$			16		

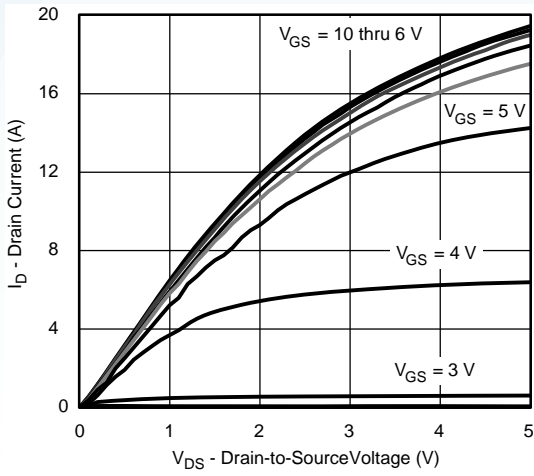
Notes:

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

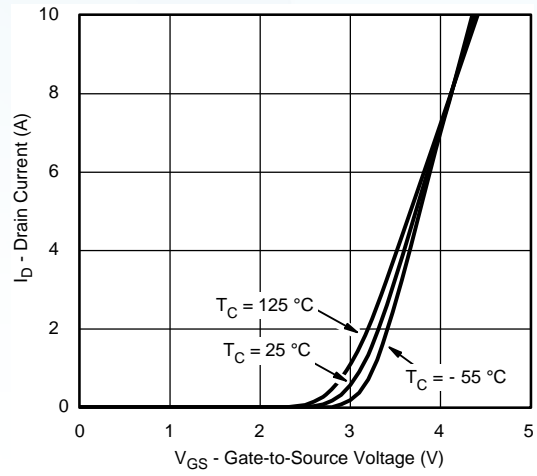
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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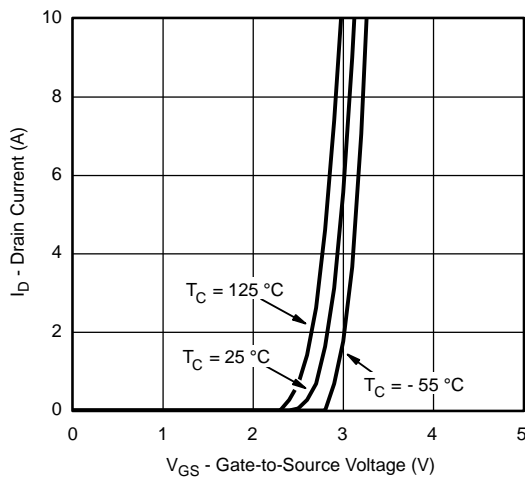
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



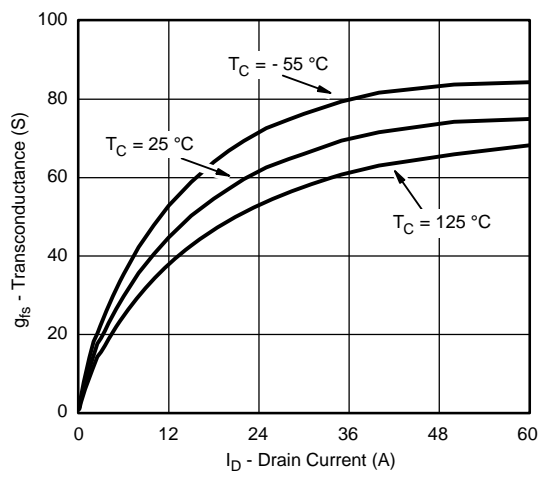
**Output Characteristics**



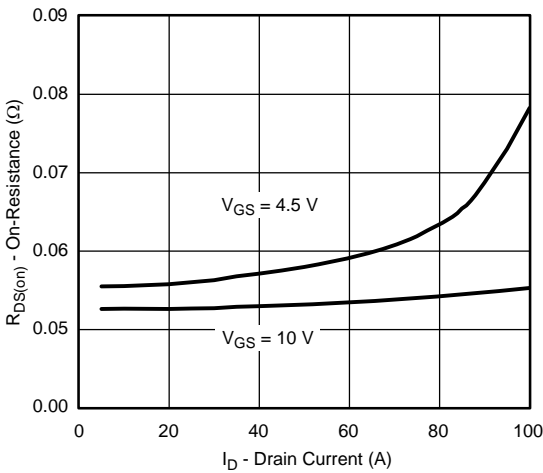
**Transfer Characteristics**



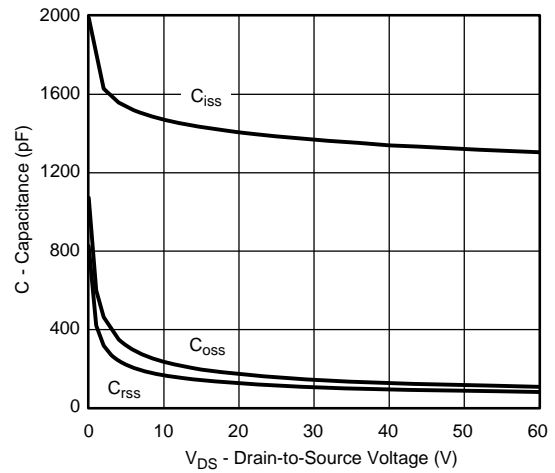
**Transfer Characteristics**



**Transconductance**



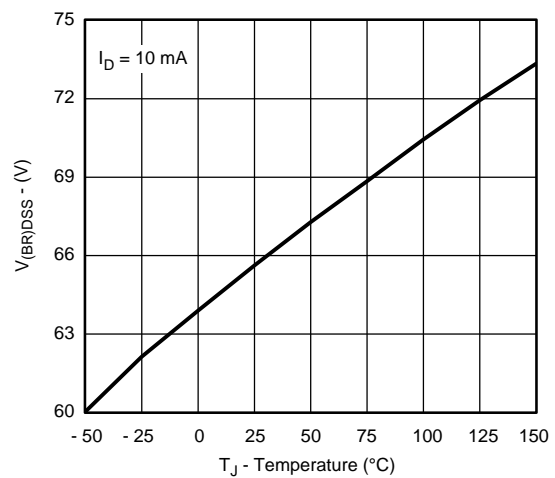
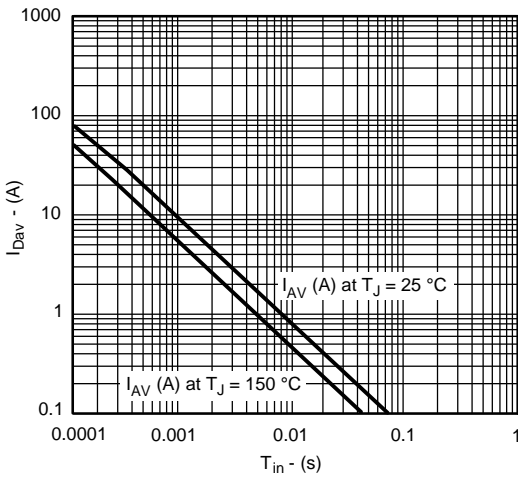
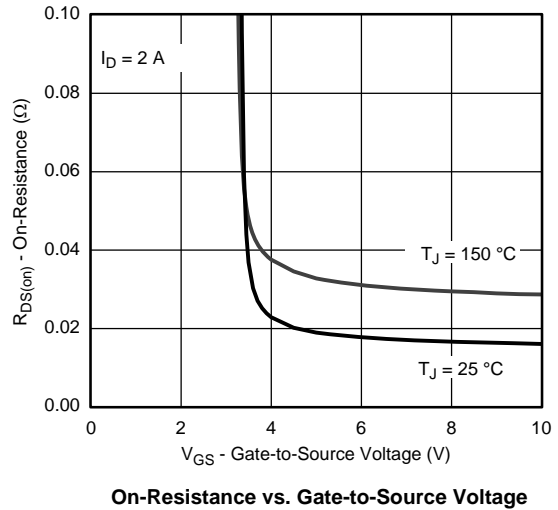
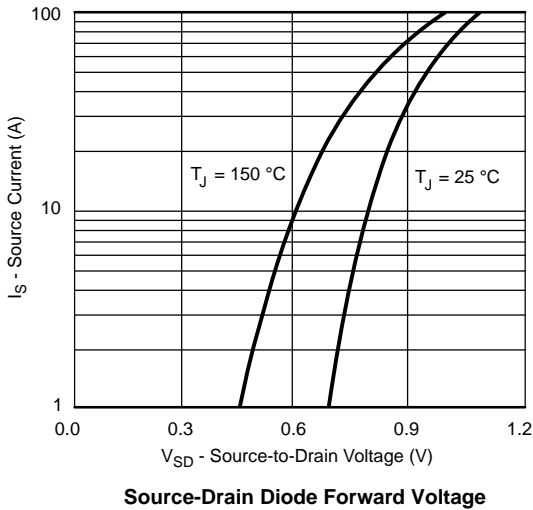
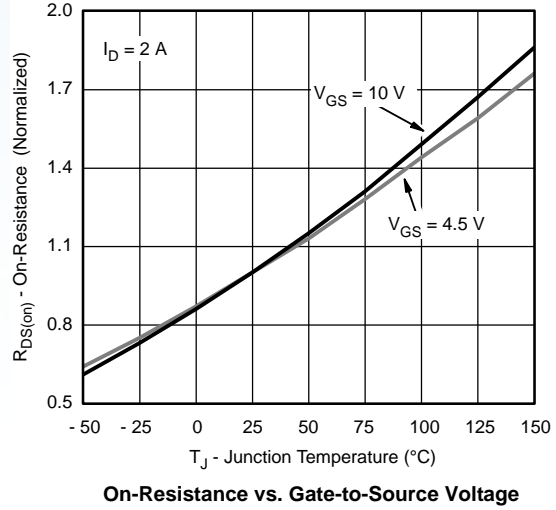
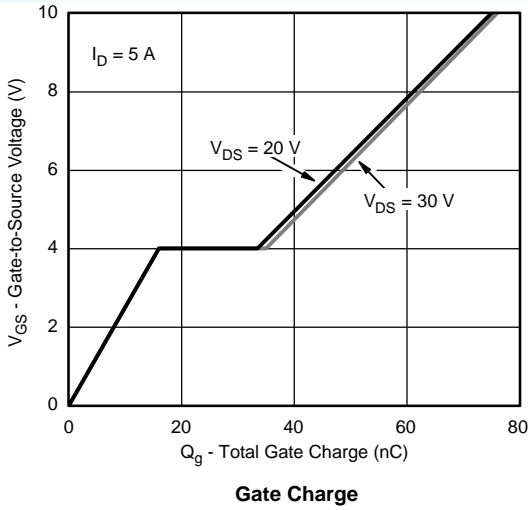
**On-Resistance vs. Drain Current**



**Capacitance**

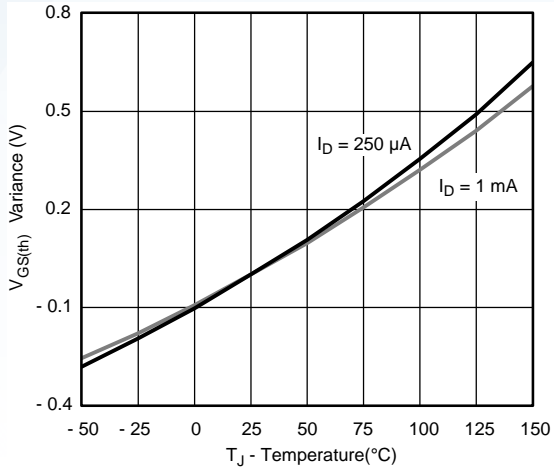
-60V P-Channel MOSFET

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

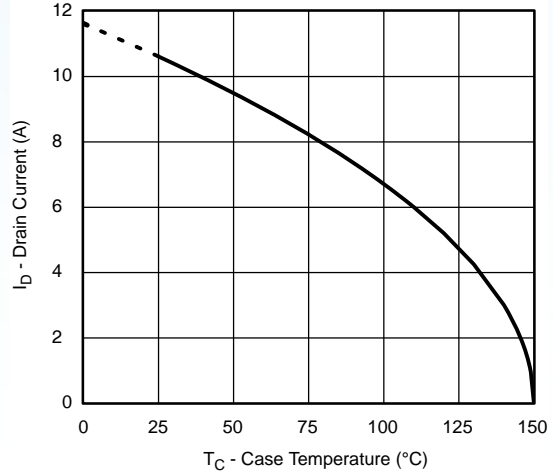


-60V P-Channel MOSFET

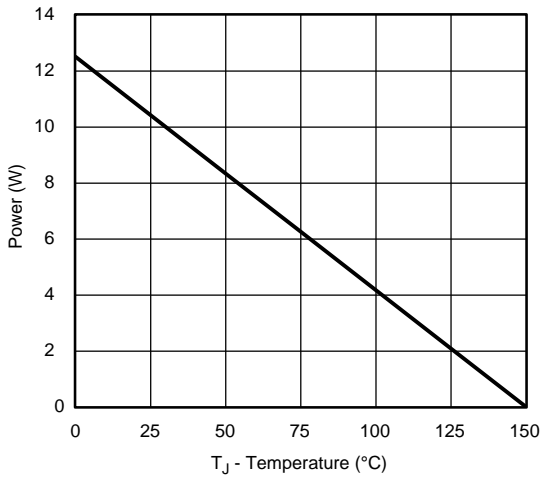
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



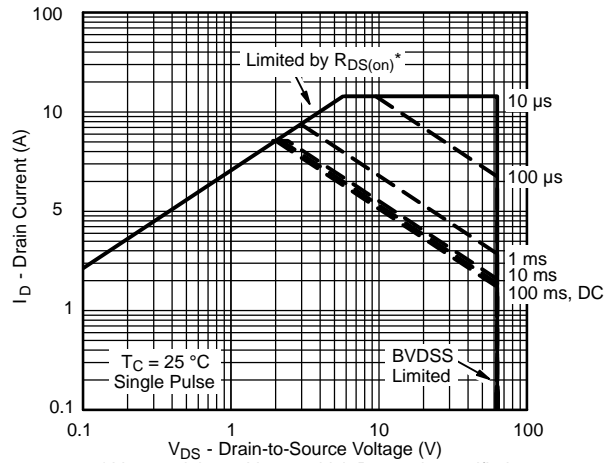
**Threshold Voltage**



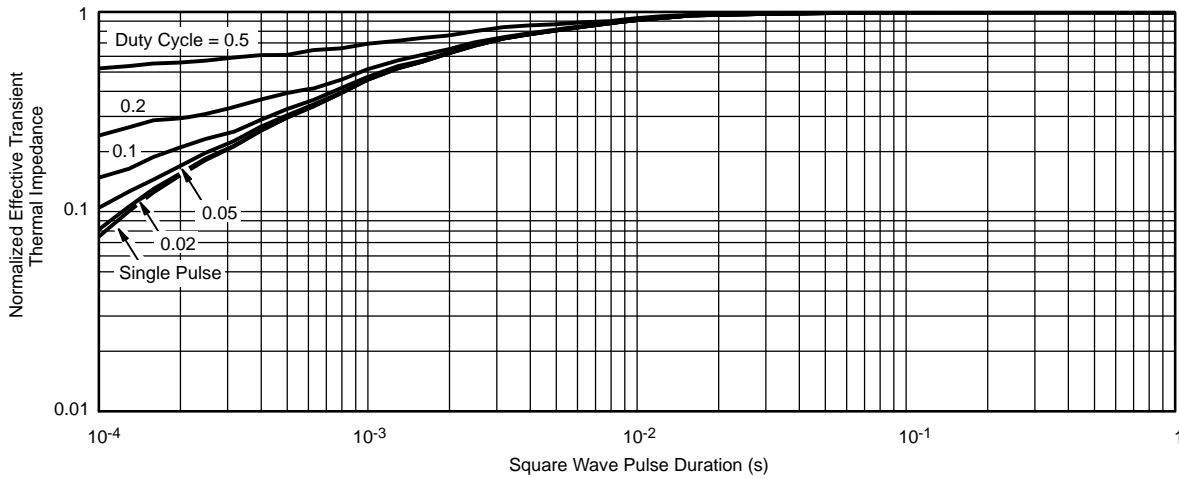
**Max. Drain Current vs. Case Temperature**



**Power Derating, Junction-to-Case**



**Safe Operating Area, Junction-to-Case**

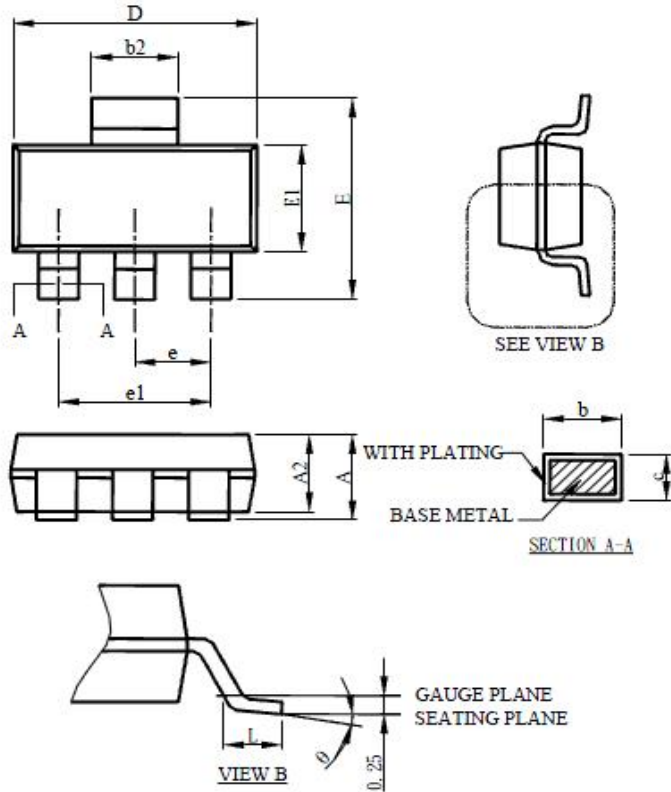


**Normalized Thermal Transient Impedance, Junction-to-Case**



**-60V P-Channel MOSFET**

**Package Mechanical Data SOT-223**



SYMBOL	SOT-223	
	MILLIMETERS	
	MIN.	MAX.
A		1.80
A1	0.02	0.10
A2	1.55	1.65
b	0.68	0.84
b2	2.90	3.10
c	0.23	0.33
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.90	
θ	0°	8°

- Note:
- 1.Refer to JEDEC TO-261AA.
  - 2.Dimension D and E1 are determined at the outermost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs, and interlead flash, but including any mismatch between the top and bottom of the plastic body.
  - 3.Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

**-60V P-Channel MOSFET****Ordering information**

<b>Order code</b>	<b>Package</b>	<b>Baseqty</b>	<b>Deliverymode</b>
NTF2955T1G	SOT-223	2500	Tape and reel



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