

PRODUCT SUMMARY

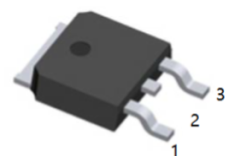
- $V_{DS} (V) = -30V$
- $R_{DS(ON)} < 43m\Omega$ ($V_{GS} = -4.5V$)
- $R_{DS(ON)} < 52m\Omega$ ($V_{GS} = -2.5V$)

FEATURES

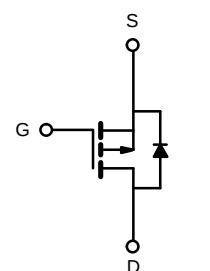
- Halogen-free

APPLICATIONS

- Load Switch
- Notebook Adaptor Switch



1.G 2.D 3.S
TO-252(DPAK) top view



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

$T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$)	I_D	$T_C = 25\text{ }^{\circ}\text{C}$	A
		$T_C = 70\text{ }^{\circ}\text{C}$	
		$T_A = 25\text{ }^{\circ}\text{C}$	
		$T_A = 70\text{ }^{\circ}\text{C}$	
Pulsed Drain Current	I_{DM}	- 112	
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^{\circ}\text{C}$	
		$T_A = 25\text{ }^{\circ}\text{C}$	
Avalanche Current	I_{AS}	- 20	
Single-Pulse Avalanche Energy	E_{AS}	20	mJ
Maximum Power Dissipation	P_D	$T_C = 25\text{ }^{\circ}\text{C}$	W
		$T_C = 70\text{ }^{\circ}\text{C}$	
		$T_A = 25\text{ }^{\circ}\text{C}$	
		$T_A = 70\text{ }^{\circ}\text{C}$	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, c}	R_{thJA}	38	46	$^{\circ}\text{C/W}$
Maximum Junction-to-Foot	R_{thJF}	20	25	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- $t = 10\text{ s}$.
- Maximum under Steady State conditions is $85\text{ }^{\circ}\text{C/W}$.
- Based on $T_C = 25\text{ }^{\circ}\text{C}$.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

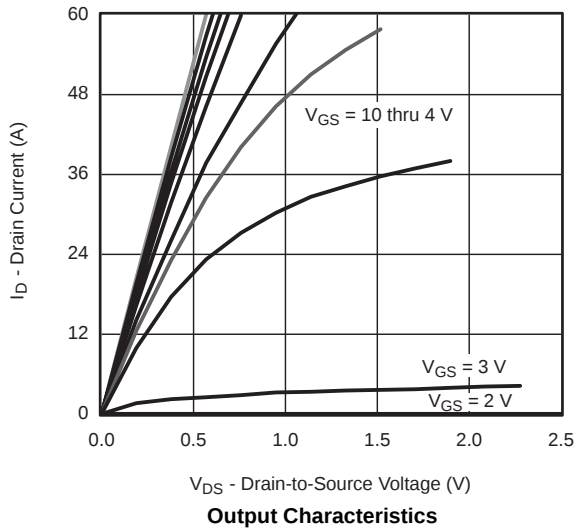
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 34		mV/ °C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5.3		
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}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 25\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -10\text{ V}$	- 30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -10\text{ A}$		33	43	mΩ
		$V_{GS} = -2.5\text{ V}, I_D = -8\text{ A}$		46	52	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -10\text{ A}$		28		S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1350		pF
Output Capacitance	C_{oss}			255		
Reverse Transfer Capacitance	C_{rss}			190		
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -10\text{ A}$		27	43	nC
		$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -10\text{ A}$		19	25	
Q_{gs}			6			
Q_{gd}			12			
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.5	2.2	4.4	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		13	25	ns
Rise Time	t_r			12	24	
Turn-Off DelayTime	$t_{d(off)}$			40	70	
Fall Time	t_f			9	18	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		48	80	
Rise Time	t_r			92	160	
Turn-Off DelayTime	$t_{d(off)}$			34	60	
Fall Time	t_f			19	35	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			- 4.1	A
Pulse Diode Forward Current	I_{SM}				- 60	
Body Diode Voltage	V_{SD}	$I_S = -3\text{ A}, V_{GS} = 0\text{ V}$		- 0.75	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -10\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		27	45	ns
Body Diode Reverse Recovery Charge	Q_{rr}			16	27	nC
Reverse Recovery Fall Time	t_a			12		ns
Reverse Recovery Rise Time	t_b			15		

Notes:

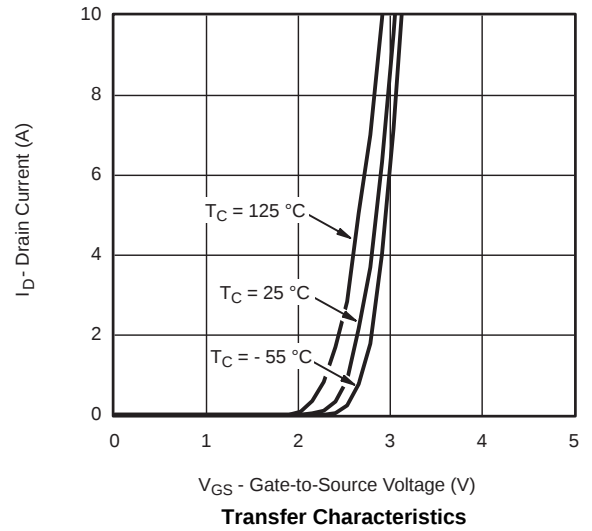
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

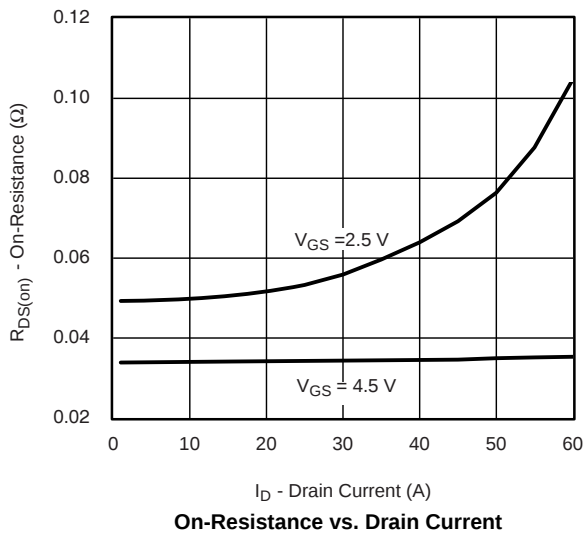
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



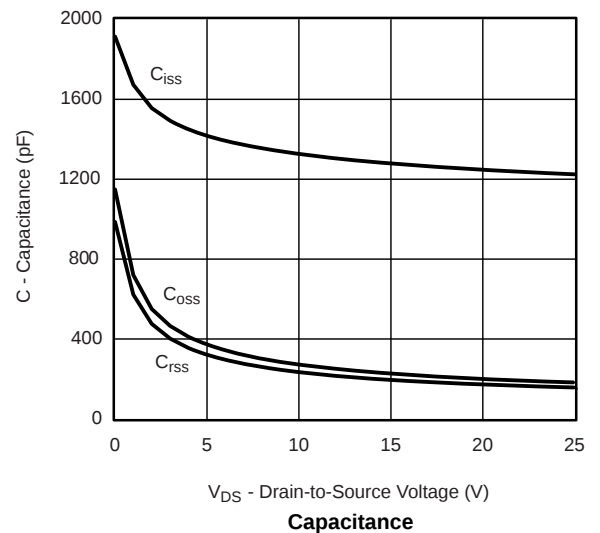
Output Characteristics



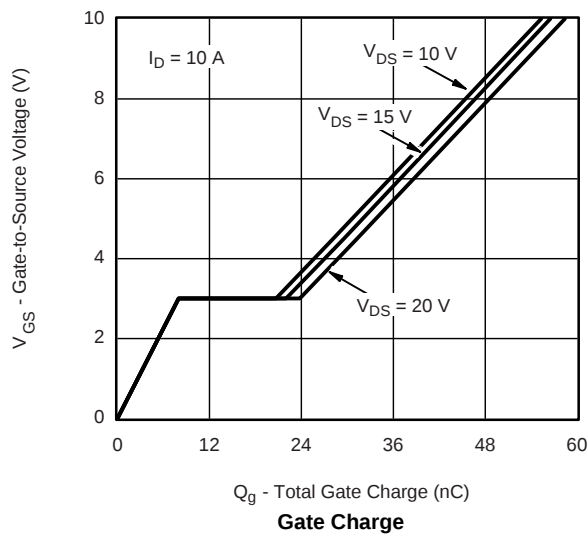
Transfer Characteristics



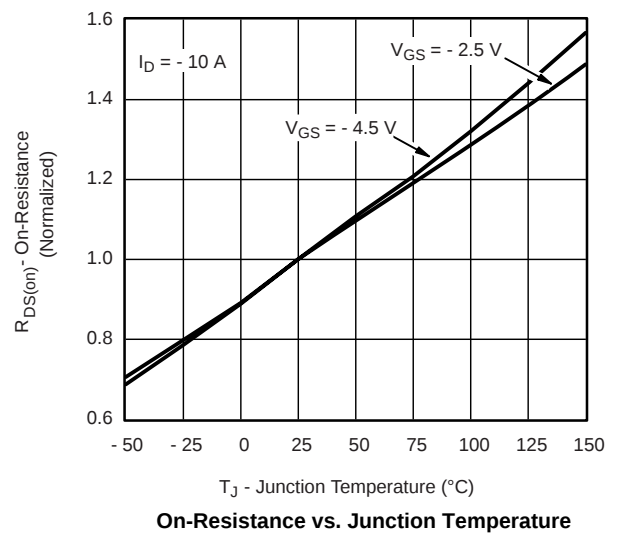
On-Resistance vs. Drain Current



Capacitance

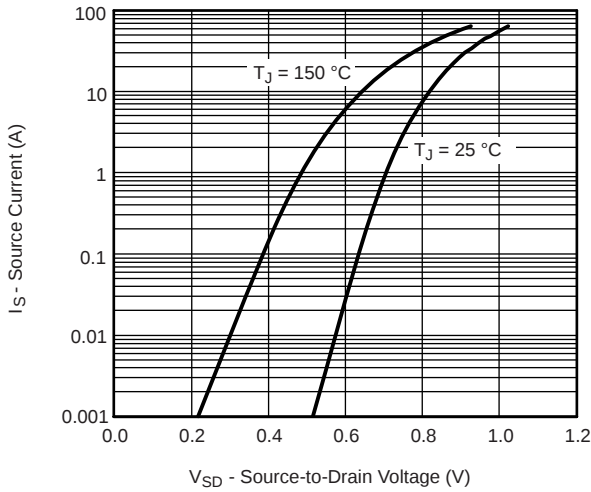


Gate Charge

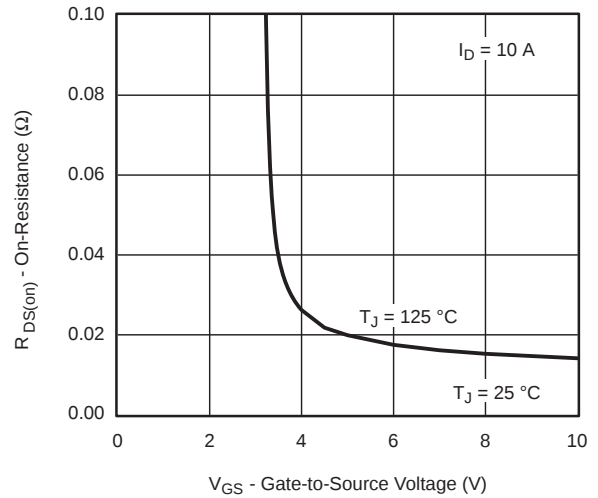


On-Resistance vs. Junction Temperature

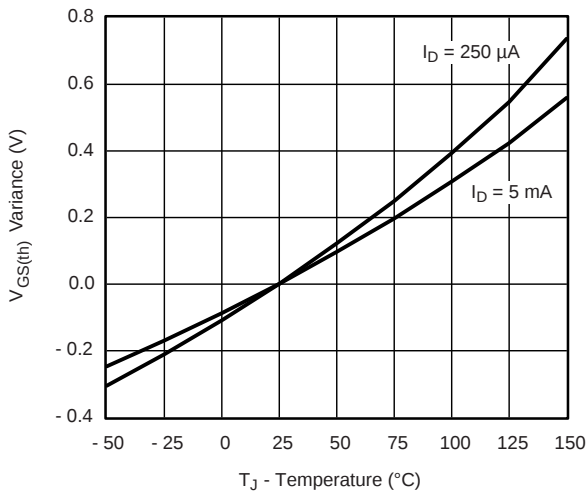
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



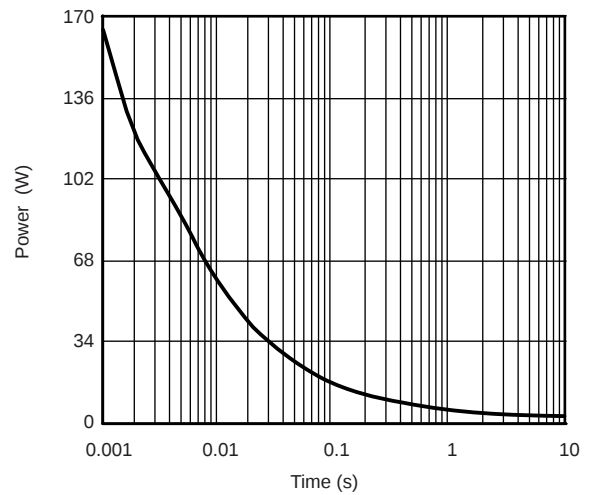
Source-Drain Diode Forward Voltage



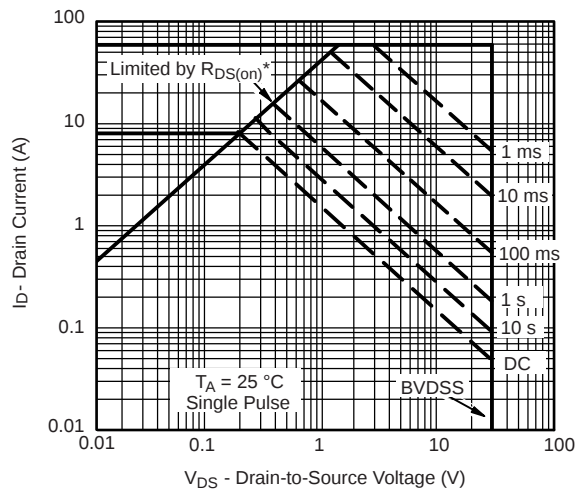
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



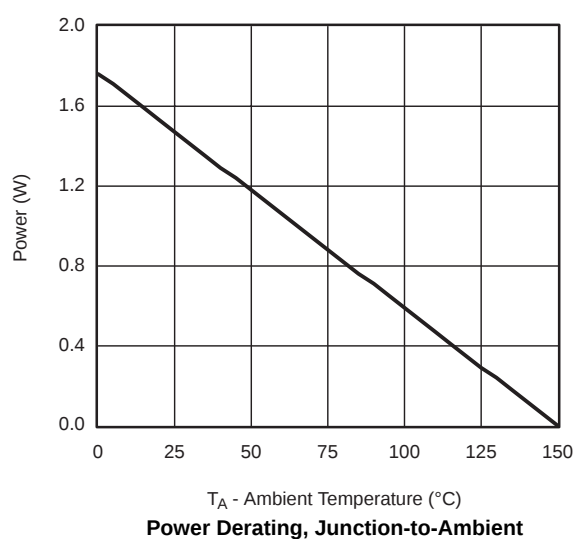
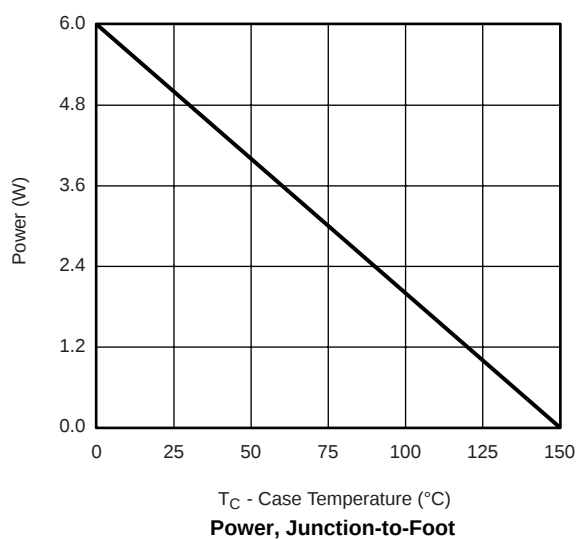
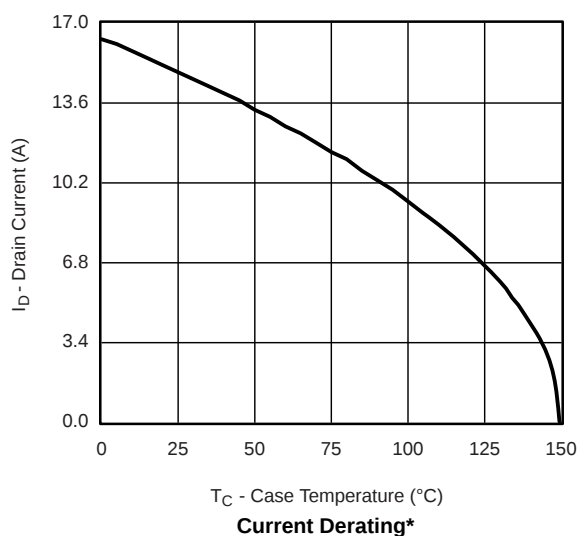
Single Pulse Power, Junction-to-Ambient



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

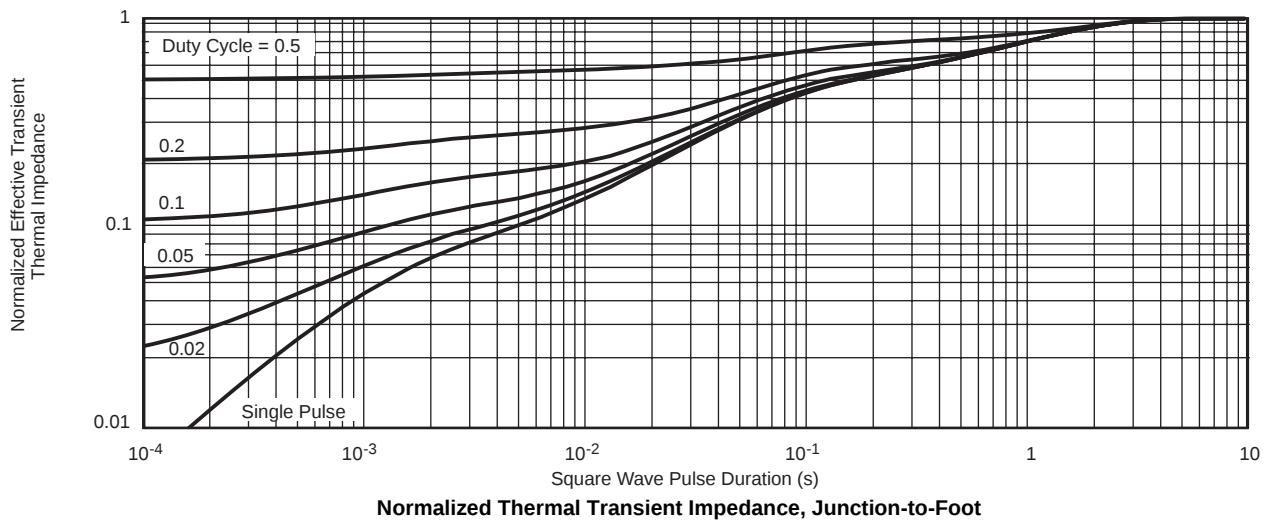
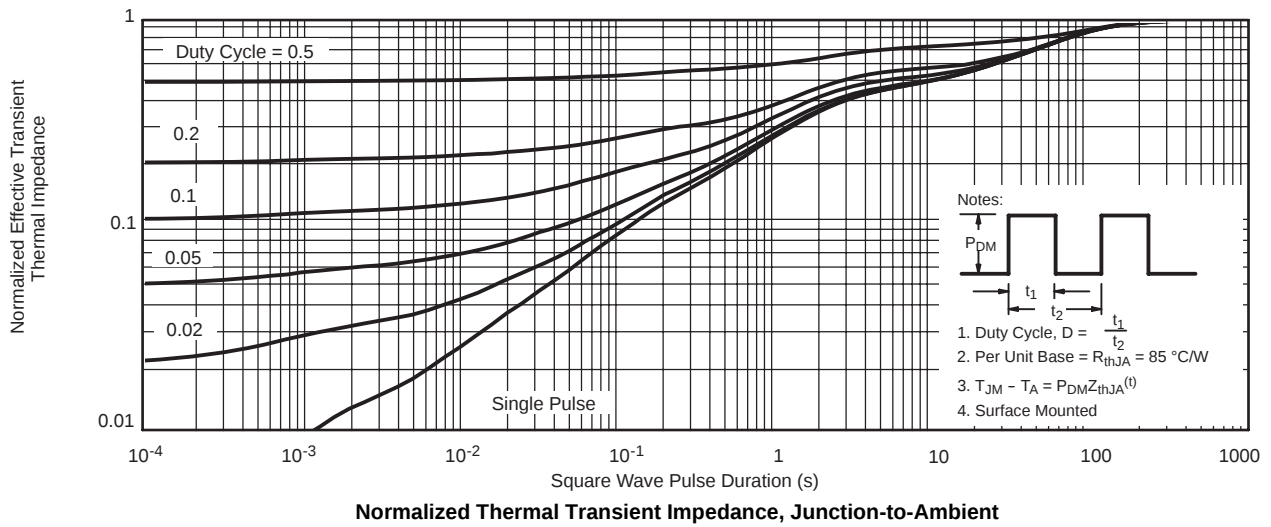
Safe Operating Area

MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

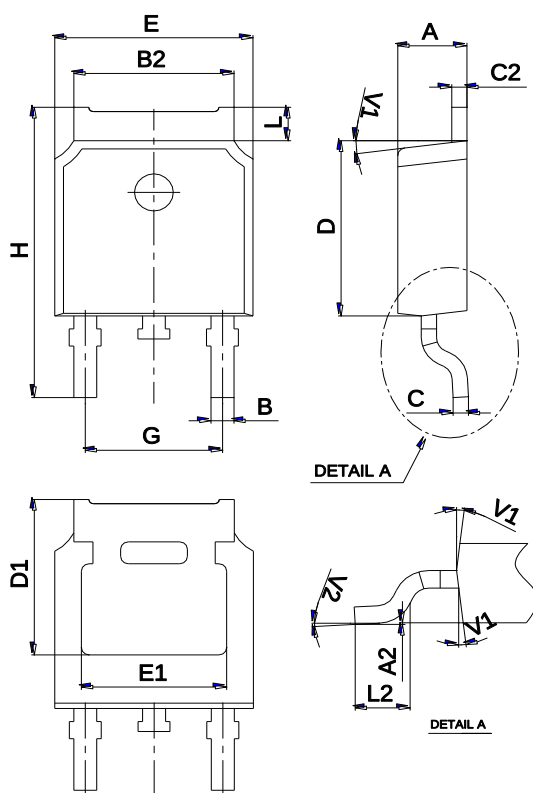


* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

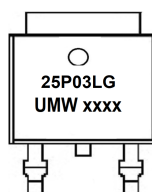


Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW NTD25P03LG	TO-252	2500	Tape and reel