

## N-Channel 60V(D-S) MOSFET

### Product summary

$V_{DS}$	60	V
$R_{DS(ON)}$ (at $V_{GS}=10V$ ) Typ.	6.8	m $\Omega$
$I_D(T_C=25^{\circ}C)$	53	A

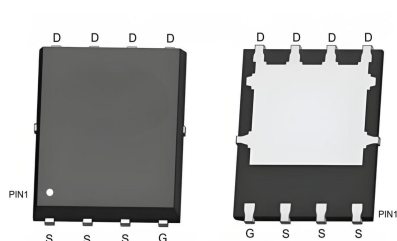
### Features

- High density cell design for low  $R_{DS(ON)}$
- Simple Drive Requirement
- Fast Switching Characteristic

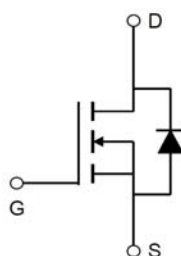
### Applications

- Power management functions

### Pin Configuration



PDFN5X6-8L



### Packing Information

Device	Marking	Reel Size	Tape Width	Quantity
ECAP53N06S	E7D0N06R	13"	12mm	3000pcs

### Absolute Maximum Ratings (at $T_A=25^{\circ}C$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V <sub>DS</sub>	Drain-Source Voltage		60	V
V <sub>GS</sub>	Gate-Source Voltage		±20	V
I <sub>D</sub>	Continuous Drain Current at V <sub>GS</sub> =10V	T <sub>C</sub> =25℃	53	A
		T <sub>C</sub> =100℃	33	A
I <sub>DM</sub>	Pulse Drain Current Tested <sup>A</sup>		188	A
E <sub>AS</sub>	Single Pulse Avalanche Energy		200	mJ
P <sub>D</sub>	Power Dissipation		50	W
T <sub>J</sub> ,T <sub>STG</sub>	Junciton and Storage Temperature Range		-55 to +150	℃

### Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient <sup>B</sup>	50	$^{\circ}C/W$

**Electrical Characteristics (at  $T_J = 25^\circ\text{C}$  Unless Otherwise Noted)**

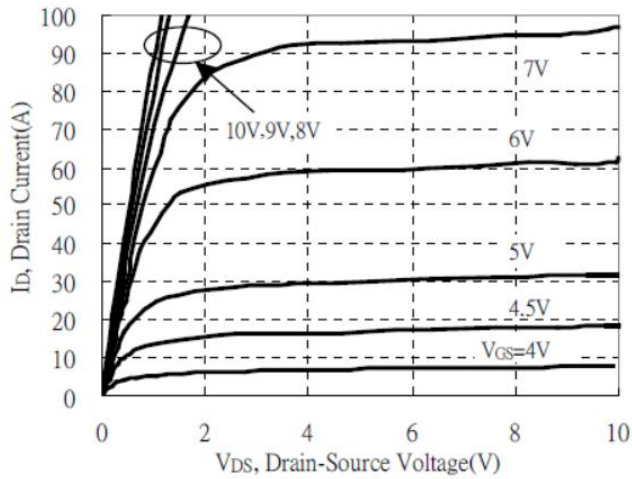
Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V,I <sub>D</sub> =250uA	60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =48V,V <sub>GS</sub> =0V	--	--	1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>DS</sub> =0V,V <sub>GS</sub> =±20V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250uA	2	--	4	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V,I <sub>D</sub> =20A	--	6.8	9	mΩ
V <sub>SD</sub>	Forward Voltage	I <sub>S</sub> =20A,V <sub>GS</sub> =0V	--	--	1.2	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current		--	--	53	A
Dynamic Parameters						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V,V <sub>DS</sub> =30V f=1MHZ	--	2017	--	pF
C <sub>oss</sub>	Output Capacitance		--	390	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	47	--	pF
Switching Parameters						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =48V,I <sub>D</sub> =20A V <sub>GS</sub> =10V	--	31.6	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	10	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	8.2	--	nC
t <sub>D(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =30V I <sub>D</sub> =20A,R <sub>G</sub> =1Ω, V <sub>GS</sub> =10V	--	20.2	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	18	--	nS
t <sub>D(off)</sub>	Turn-off Delay Time		--	39.2	--	nS
t <sub>f</sub>	Turn-off Fall Time		--	9.8	--	nS

A. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

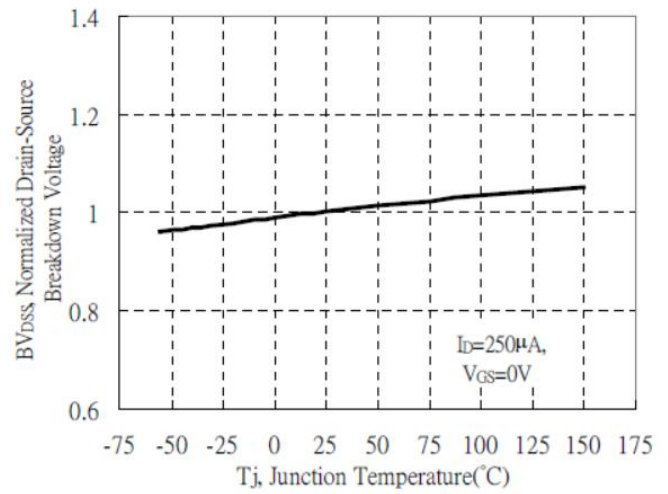
B.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design, while  $R_{\theta JA}$  is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper

## Typical Characteristics

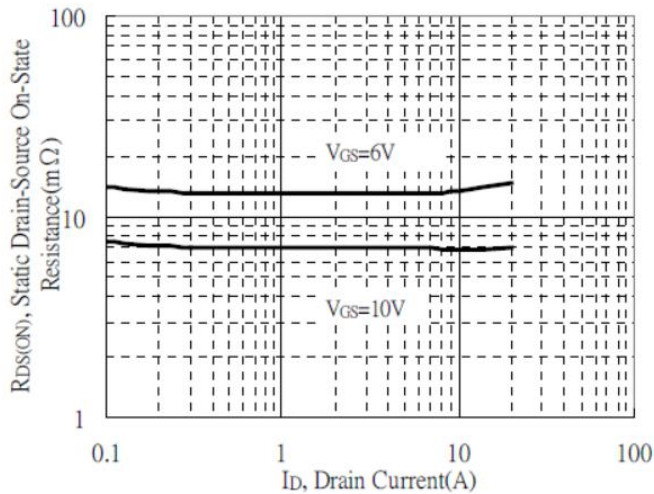
Typical Output Characteristics



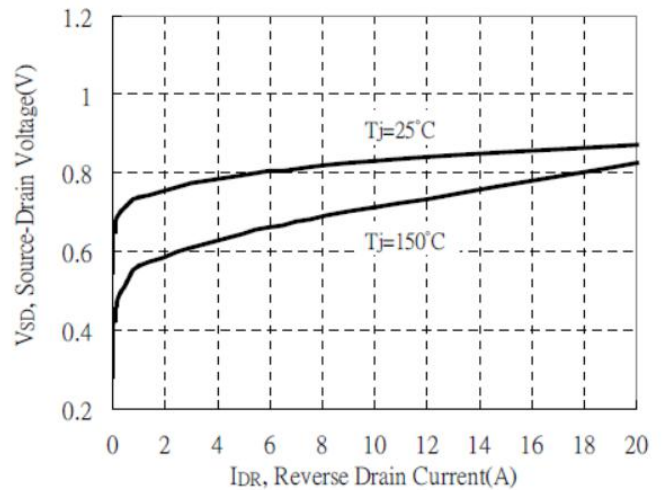
Brekdown Voltage vs Ambient Temperature



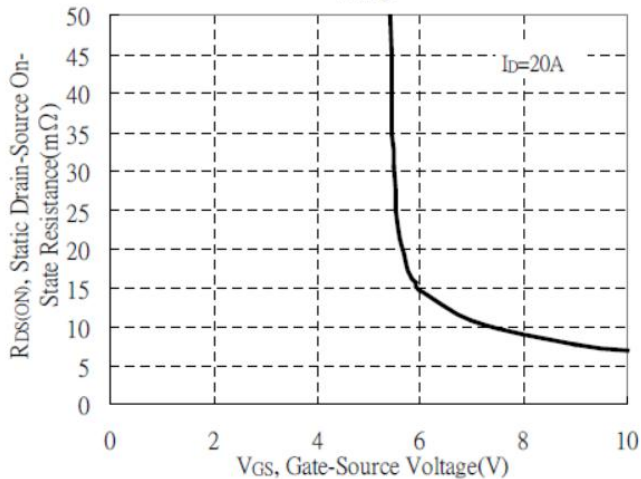
Static Drain-Source On-State resistance vs Drain Current



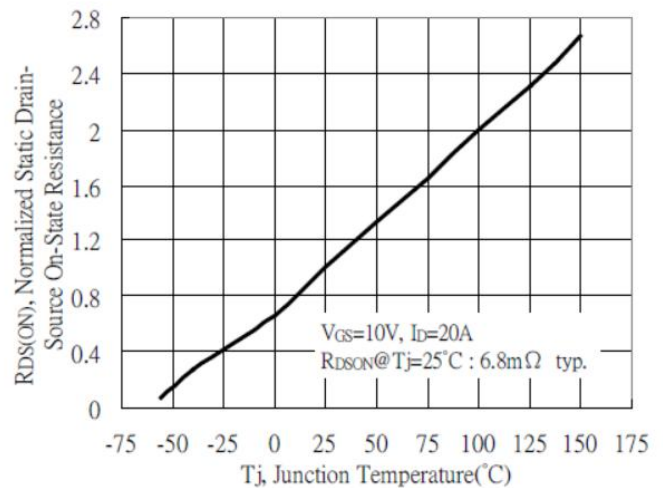
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

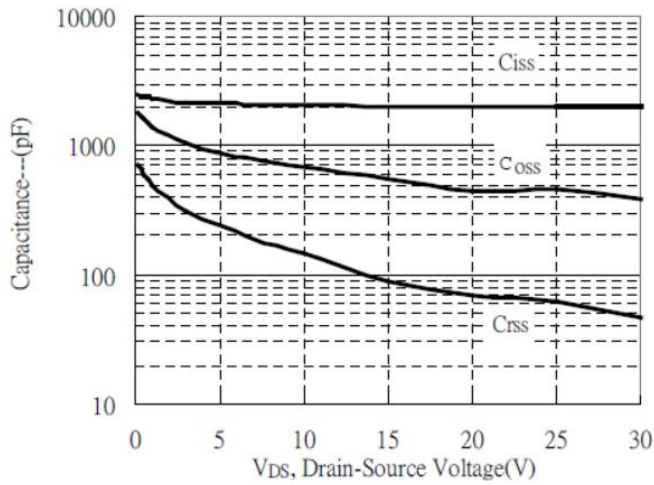


Drain-Source On-State Resistance vs Junction Temperature

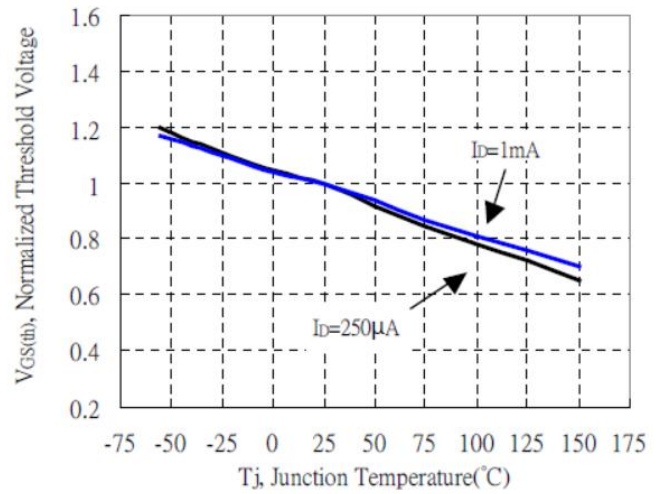


## Typical Characteristics

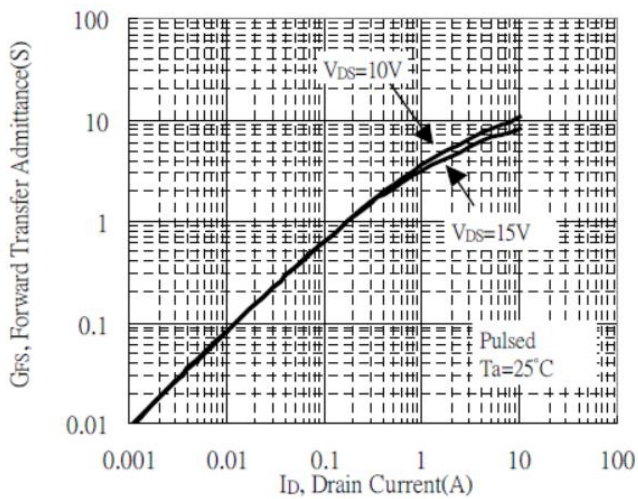
Capacitance vs Drain-to-Source Voltage



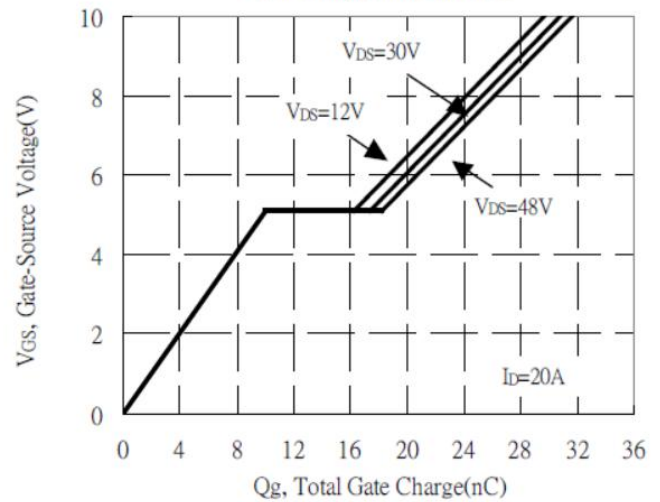
Threshold Voltage vs Junction Temperature



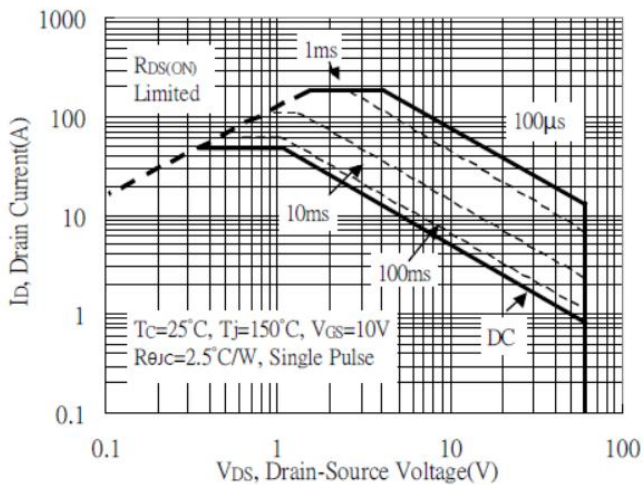
Forward Transfer Admittance vs Drain Current



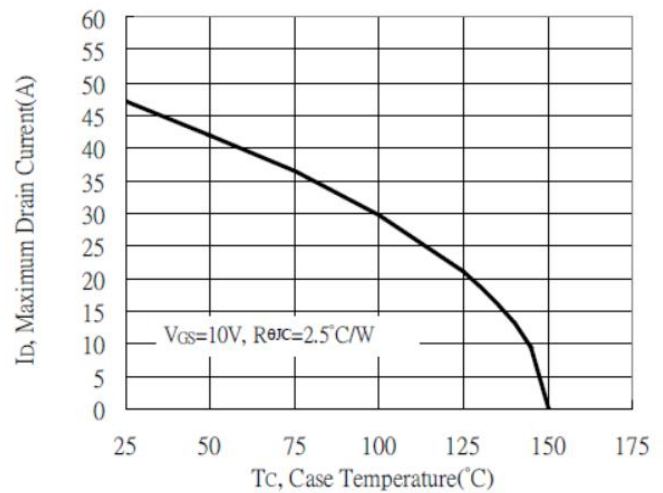
Gate Charge Characteristics



Maximum Safe Operating Area



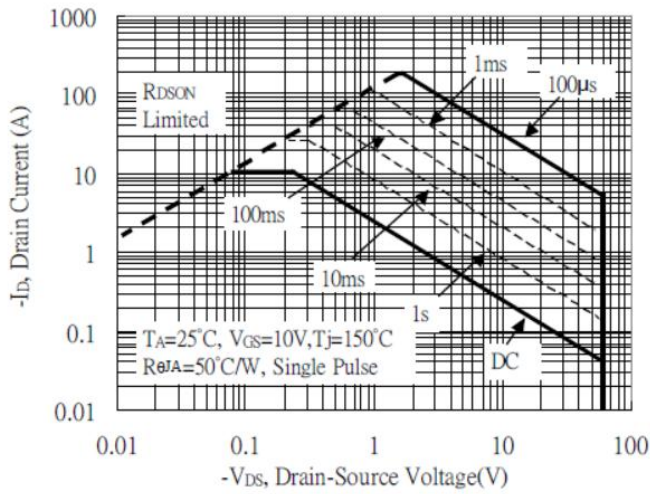
Maximum Drain Current vs Case Temperature



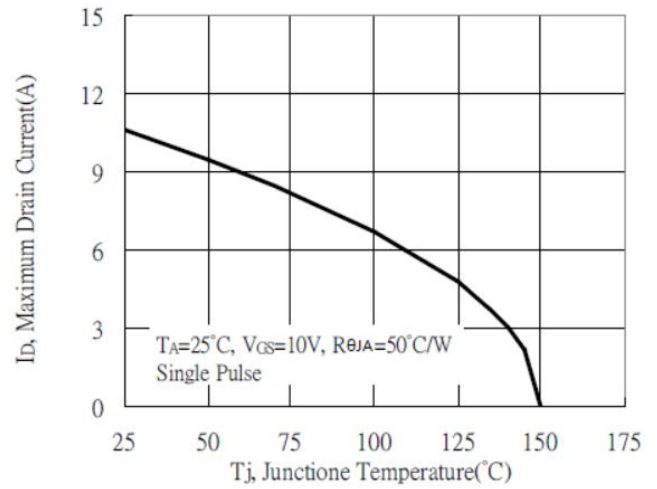


## Typical Characteristics

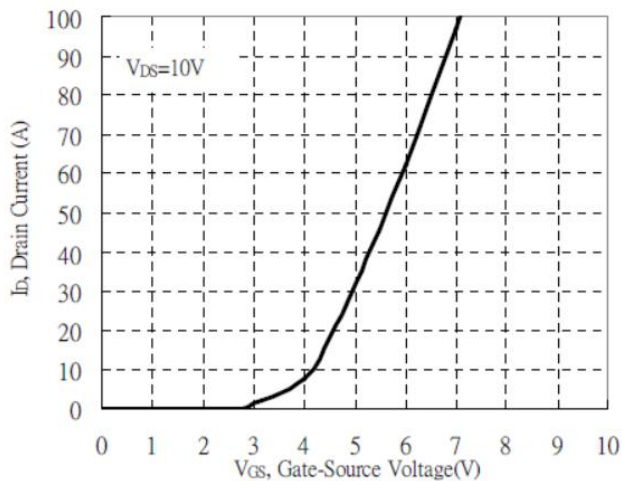
Maximum Safe Operating Area



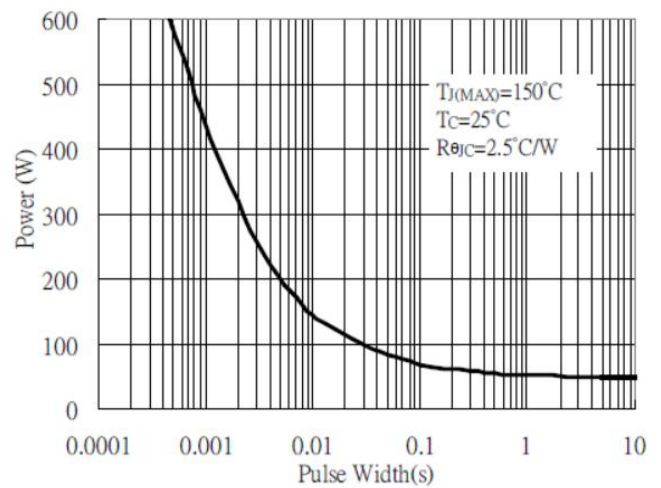
Maximum Drain Current vs Junction Temperature



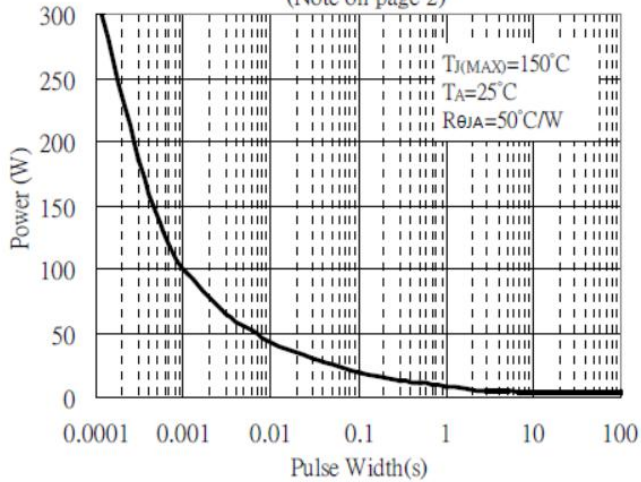
Typical Transfer Characteristics



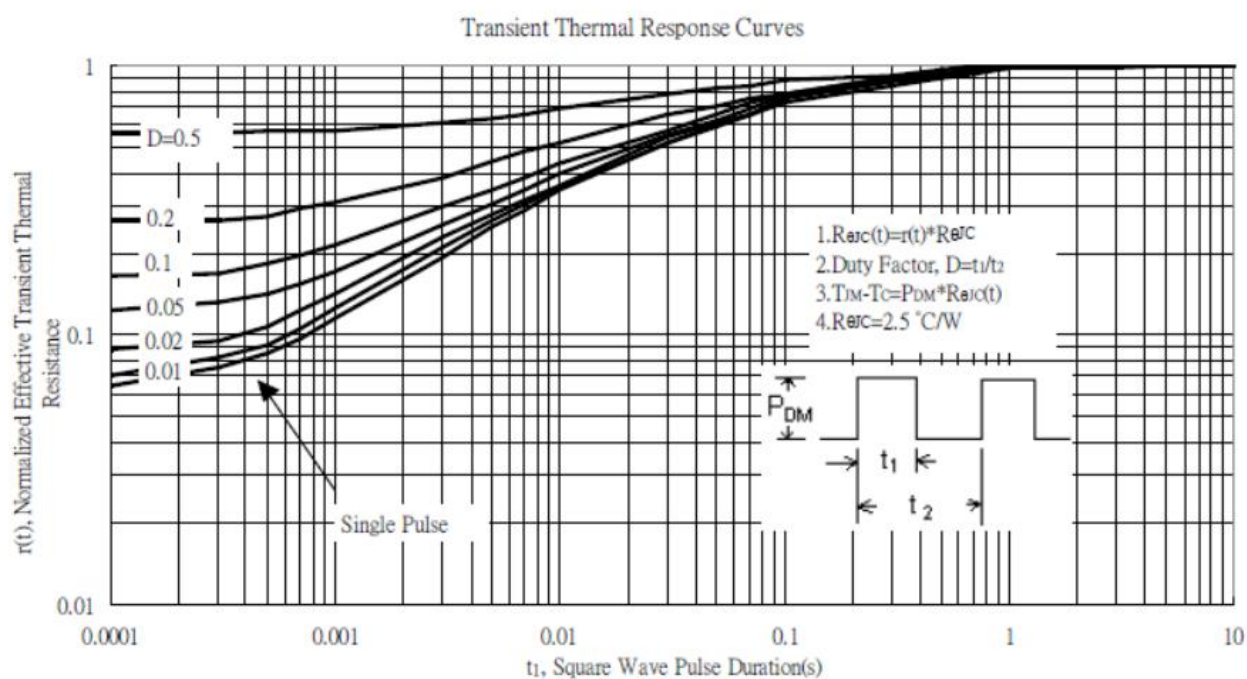
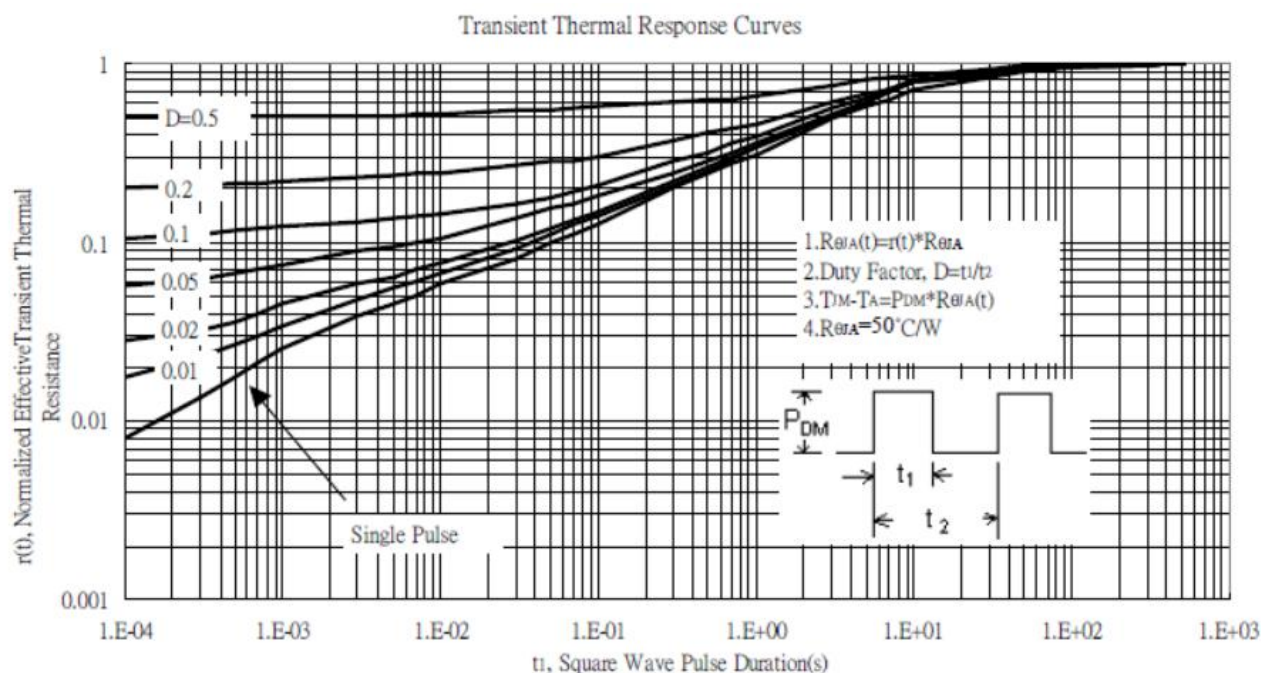
Single Pulse Maximum Power Dissipation



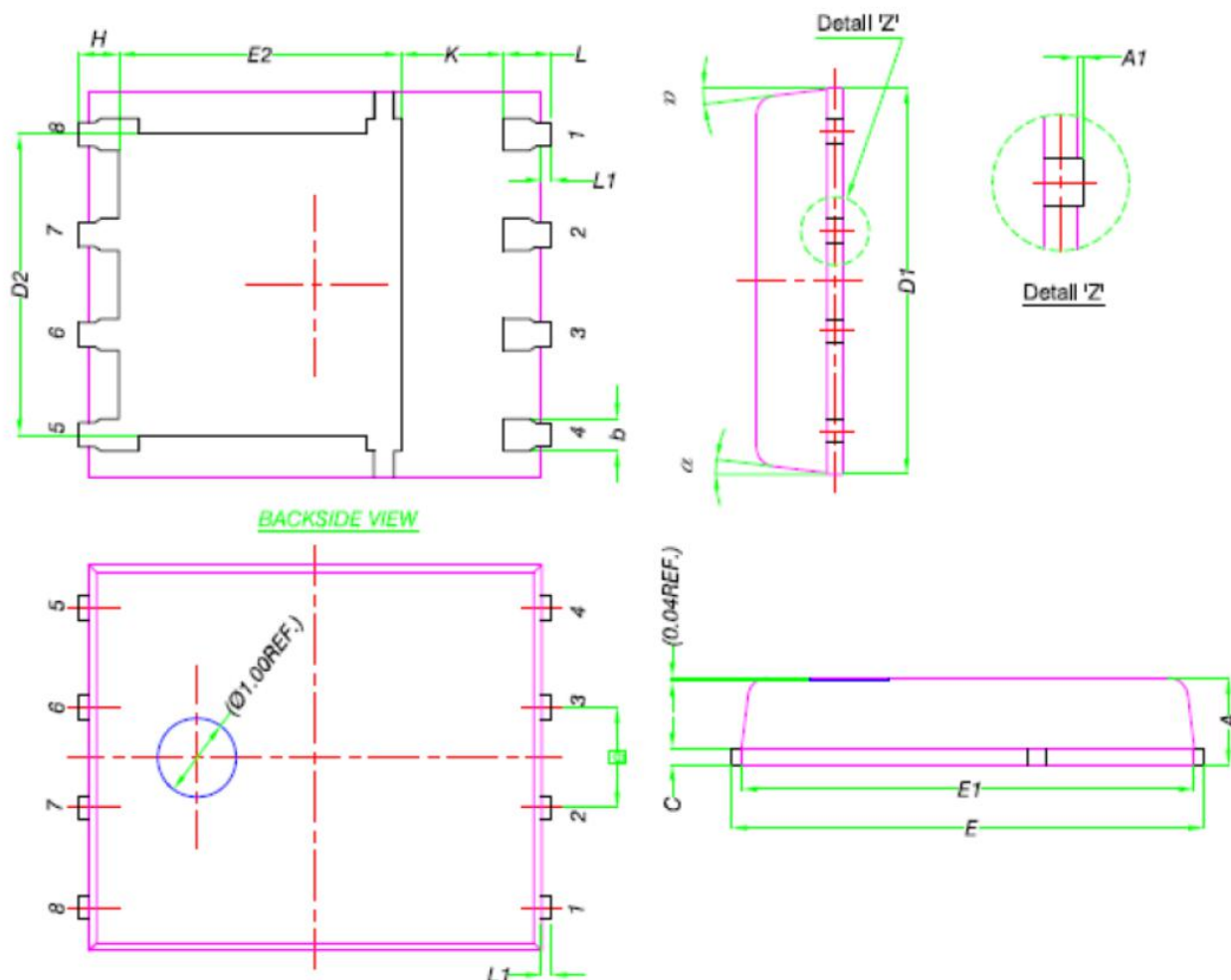
Single Pulse Power Rating, Junction to Ambient  
(Note on page 2)



## Typical Characteristics



## PDFN5X6-8L Package Information



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.90	1.10	0.035	0.043	E2	3.38	3.78	0.133	0.149
A1	0.00	0.05	0.000	0.002	e	1.27	BSC	0.050	BSC
b	0.33	0.51	0.013	0.020	H	0.41	0.61	0.016	0.024
C	0.20	0.30	0.008	0.012	K	1.10	-	0.043	-
D1	4.80	5.00	0.189	0.197	L	0.51	0.71	0.020	0.028
D2	3.61	3.96	0.142	0.156	L1	0.06	0.20	0.002	0.008
E	5.90	6.10	0.232	0.240	θ	8°	12°	8°	12°
E1	5.70	5.80	0.224	0.228					