

# SSG4520H

**N-Ch: 6.6 A, 20 V,  $R_{DS(ON)}$  47 m $\Omega$**   
**P-Ch: -5.2 A, -20 V,  $R_{DS(ON)}$  79 m $\Omega$**   
**N & P-Ch Enhancement Mode Power MOSFET**

RoHS Compliant Product  
 A suffix of "-C" specifies halogen & lead-free

## DESCRIPTION

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low  $R_{DS(on)}$  and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones

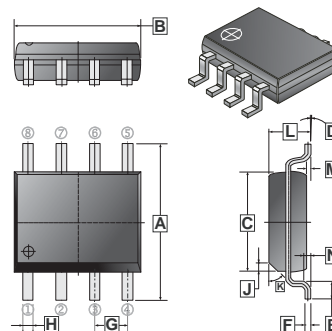
## FEATURES

- Low  $R_{DS(on)}$  provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe SOP-8 saves board space
- Fast switching speed
- High performance trench technology

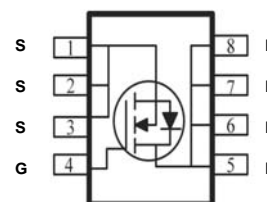
## PACKAGE INFORMATION

Package	MPQ	LeaderSize
SOP-8	2.5K	13' inch

### SOP-8



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.8	6.20	H	0.35	0.51
B	4.80	5.00	J	0.375	REF.
C	3.80	4.00	K	45°	
D	0°	8°	L	1.35	1.75
E	0.50	0.93	M	0.10	0.25
F	0.19	0.25	N	0.25	REF.
G	1.27 TYP.				



## MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	N-CH	P-CH	Unit
Drain-Source Voltage	$V_{DS}$	20	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	$\pm 8$	V
Continuous Drain Current <sup>1</sup>	$I_D @ T_A = 25^\circ\text{C}$	6.6	-5.2	A
	$I_D @ T_A = 70^\circ\text{C}$	5.5	-4.2	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	20	-20	A
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	1.3	-1.3	A
Total Power Dissipation <sup>1</sup>	$P_D @ T_A = 25^\circ\text{C}$	3.1	3.1	W
	$P_D @ T_A = 70^\circ\text{C}$	1.3	1.3	W
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 ~ 150		$^\circ\text{C}$
<b>Thermal Resistance Ratings</b>				
Maximum Junction-to-Ambient <sup>1</sup>	$t \leq 10$ sec	$R_{\theta JA}$	40	$^\circ\text{C} / \text{W}$
	Steady State		110	$^\circ\text{C} / \text{W}$

Notes:

1. Surface Mounted on 1" x 1" FR4 Board.
2. Pulse width limited by maximum junction temperature.

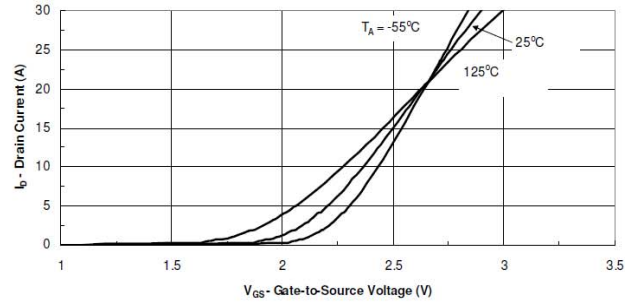
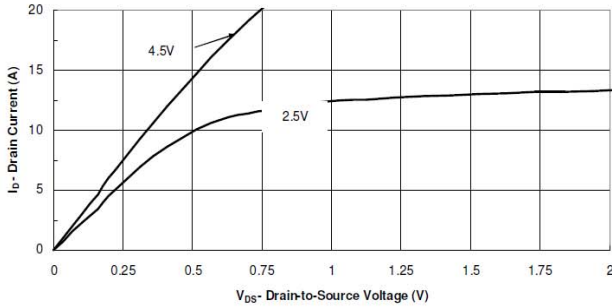
**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Ch	Min.	Typ.	Max.	Unit	Teat Conditions
<b>Static</b>							
Gate Threshold Voltage	V <sub>GS(th)</sub>	N	0.4	-	-	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
		P	0	-	-		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Gate-Body Leakage	I <sub>GSS</sub>	N	-	-	±100	nA	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 12V
		P	-	-	±100		V <sub>DS</sub> = 0V, V <sub>GS</sub> = -12V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	N	-	-	1	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
		P	-	-	-1		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
On-State Drain Current <sup>1</sup>	I <sub>D(on)</sub>	N	20	-	-	A	V <sub>DS</sub> = 5V, V <sub>GS</sub> = 4.5V
		P	-20	-	-		V <sub>DS</sub> = -5V, V <sub>GS</sub> = -4.5V
Drain-Source On-Resistance <sup>1</sup>	R <sub>DS(ON)</sub>	N	-	-	47	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.6A
			-	-	55		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 6.2A
		P	-	-	79		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5.2A
			-	-	110		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -4.4A
Forward Transconductance <sup>1</sup>	g <sub>fs</sub>	N	-	25	-	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 6.6A
		P	-	10	-		V <sub>DS</sub> = -15V, I <sub>D</sub> = -5.2A
<b>Dynamic <sup>2</sup></b>							
Total Gate Charge	Q <sub>g</sub>	N	-	6.3	-	nC	N-Channel I <sub>D</sub> = 6.6A, V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V  P-Channel I <sub>D</sub> = -5.2A, V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V
		P	-	10	-		
Gate-Source Charge	Q <sub>gs</sub>	N	-	0.9	-		
		P	-	2.2	-		
Gate-Drain Charge	Q <sub>gd</sub>	N	-	1.9	-		
		P	-	1.7	-		
<b>Switching</b>							
Turn-On Delay Time	T <sub>d(on)</sub>	N	-	7.4	-	nS	N-Channel V <sub>DD</sub> = 15V, V <sub>GS</sub> = 4.5V I <sub>D</sub> = 1A, R <sub>GEN</sub> = 6Ω  P-Channel V <sub>DD</sub> = -15V, V <sub>GS</sub> = -4.5V I <sub>D</sub> = -1A, R <sub>GEN</sub> = 6Ω
		P	-	7.6	-		
Rise Time	T <sub>r</sub>	N	-	4	-		
		P	-	6.8	-		
Turn-Off Delay Time	T <sub>d(off)</sub>	N	-	22.2	-		
		P	-	33.6	-		
Fall Time	T <sub>f</sub>	N	-	3.6	-		
		P	-	23.2	-		

Notes:

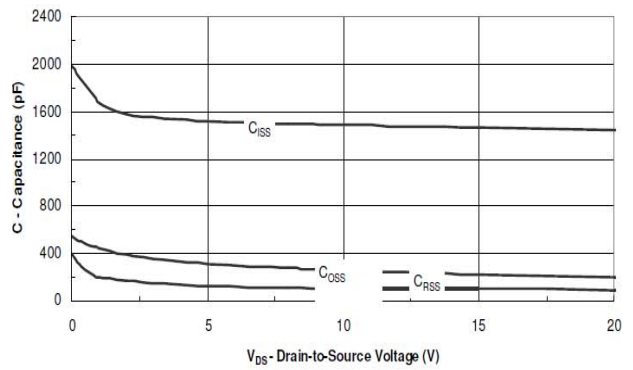
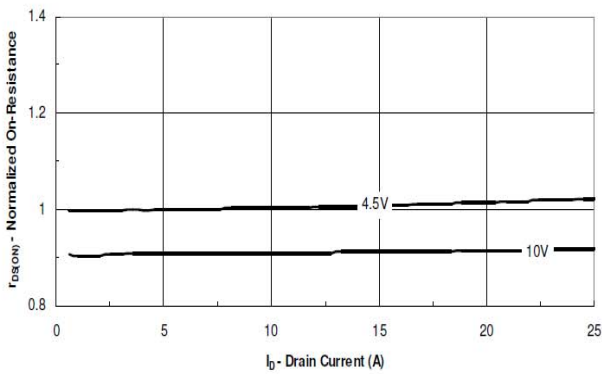
- Pulse test : PW ≤ 300μs duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

**CHARACTERISTIC CURVES (N-Channel)**



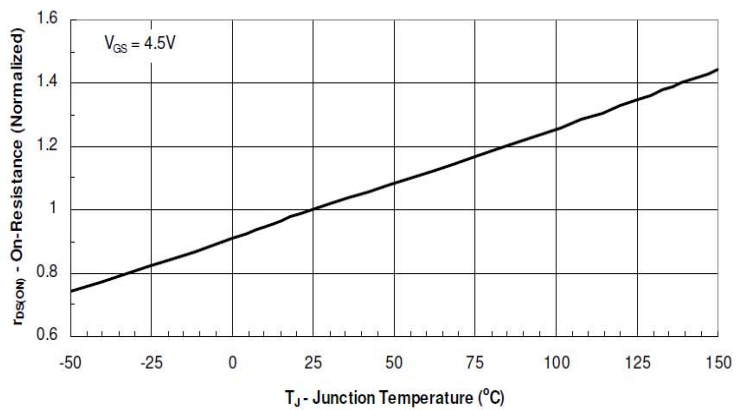
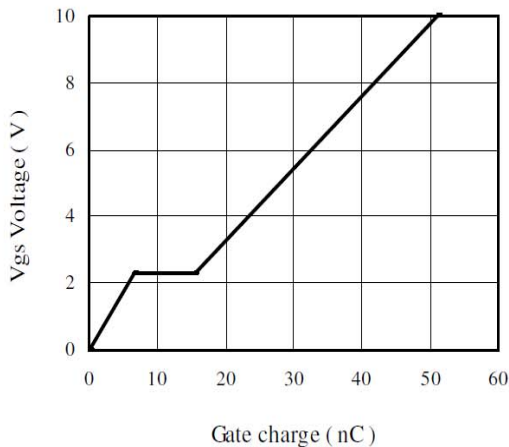
**Output Characteristics**

**Transfer Characteristics**



**On-Resistance vs. Drain Current**

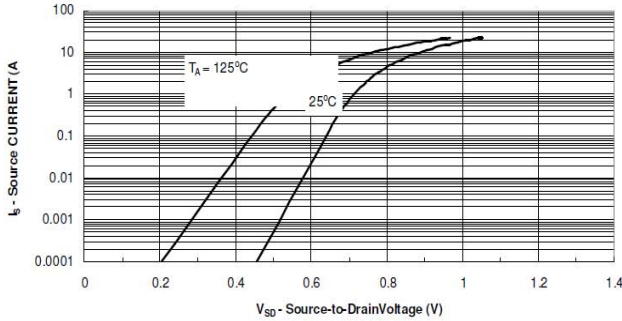
**Capacitance**



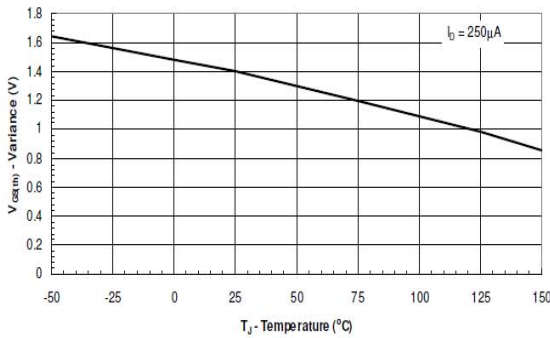
**Gate Charge**

**On-Resistance vs. Junction Temperature**

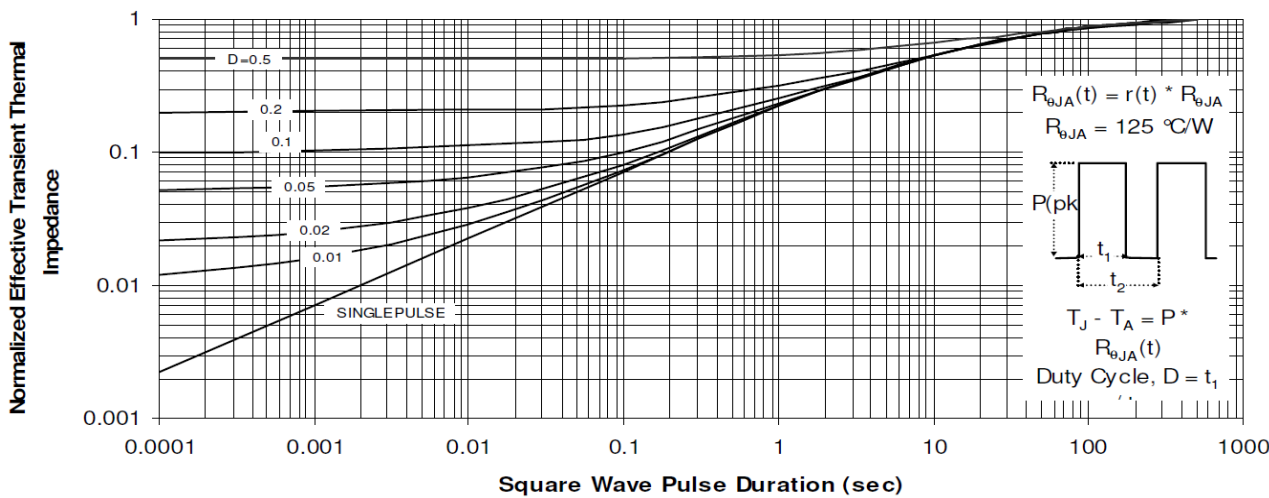
**CHARACTERISTIC CURVES**



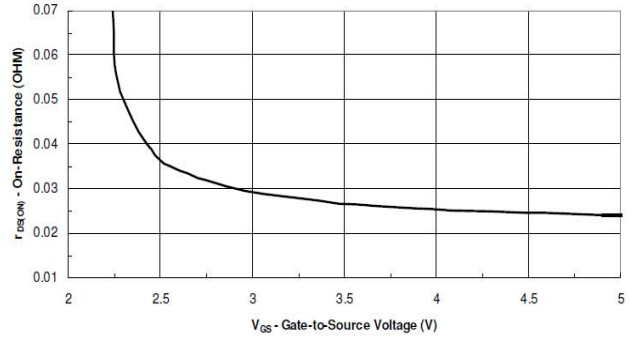
Source-Drain Diode Forward Voltage



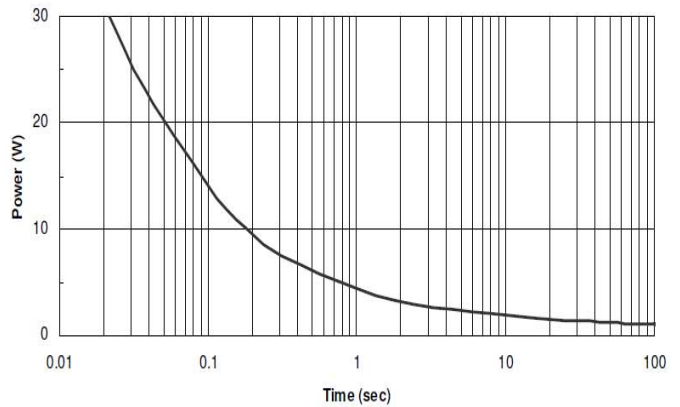
Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient



On-Resistance vs. Gate-to Source Voltage



Single Pulse Power

**CHARACTERISTIC CURVES (P-Channel)**

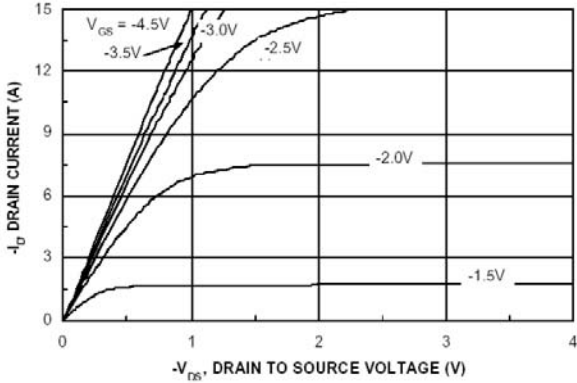


Figure 1. On-Region Characteristics

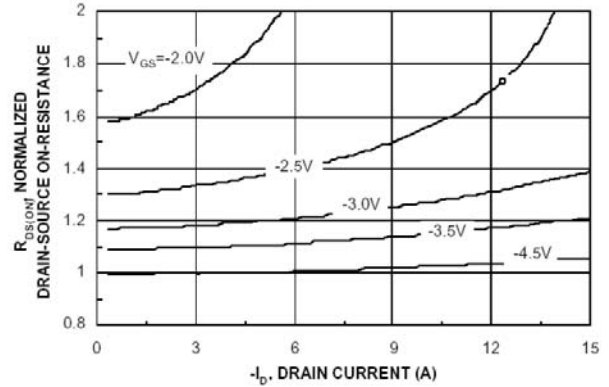


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

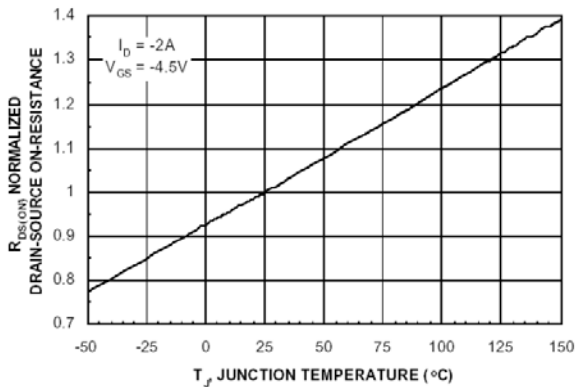


Figure 3. On-Resistance Variation with Temperature

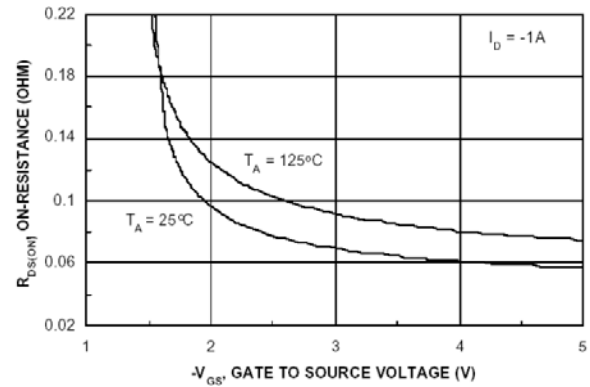


Figure 4. On-Resistance Variation with Gate to Source Voltage

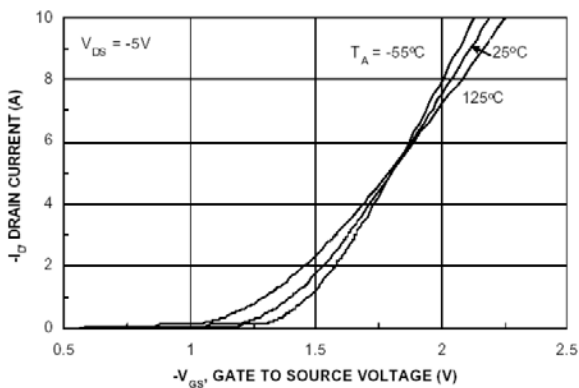


Figure 5. Transfer Characteristics

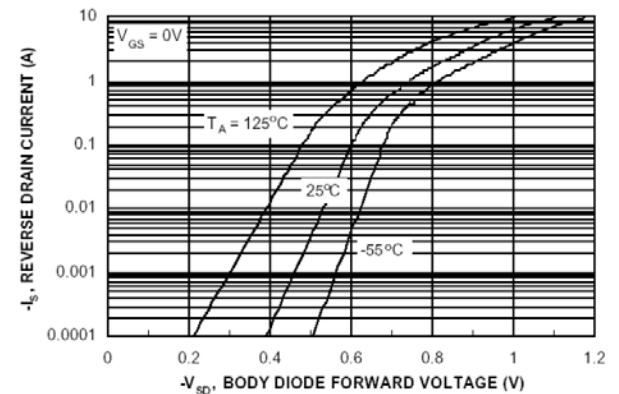


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

**CHARACTERISTIC CURVES**

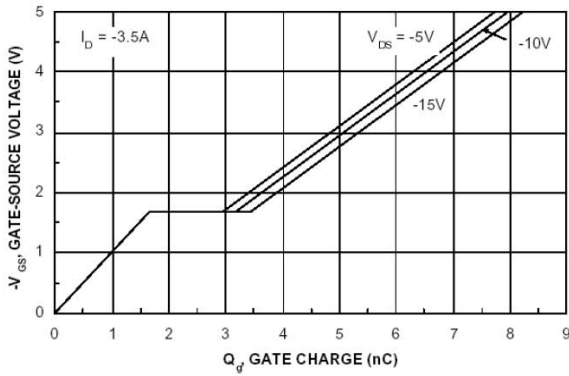


Figure 7. Gate Charge Characteristic

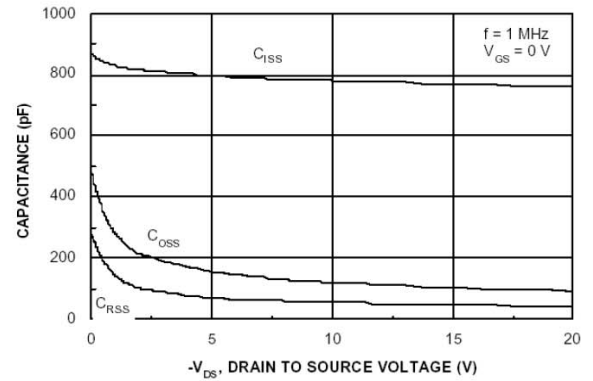


Figure 8. Capacitance Characteristic

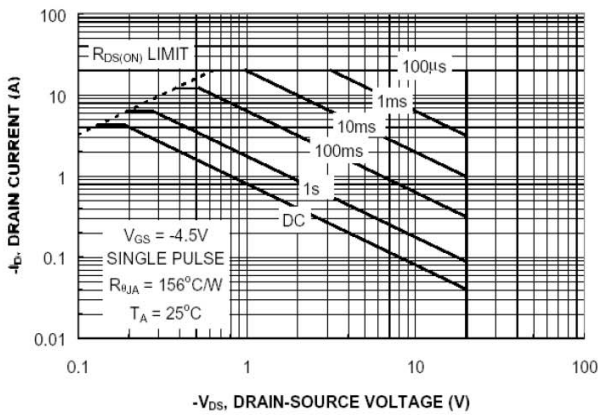


Figure 9. Maximum Safe Operating Area

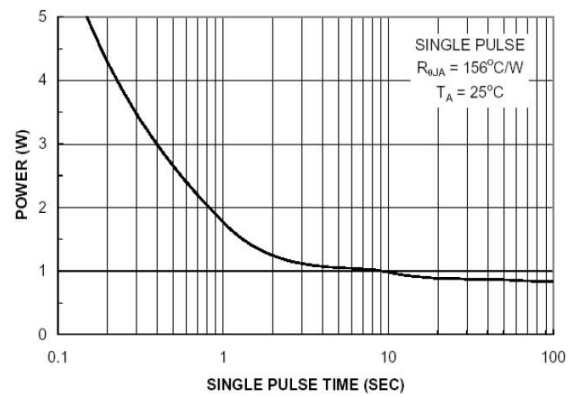


Figure 10. Single Pulse Maximum Power Dissipation

**Normalized Thermal Transient Junction to Ambient**

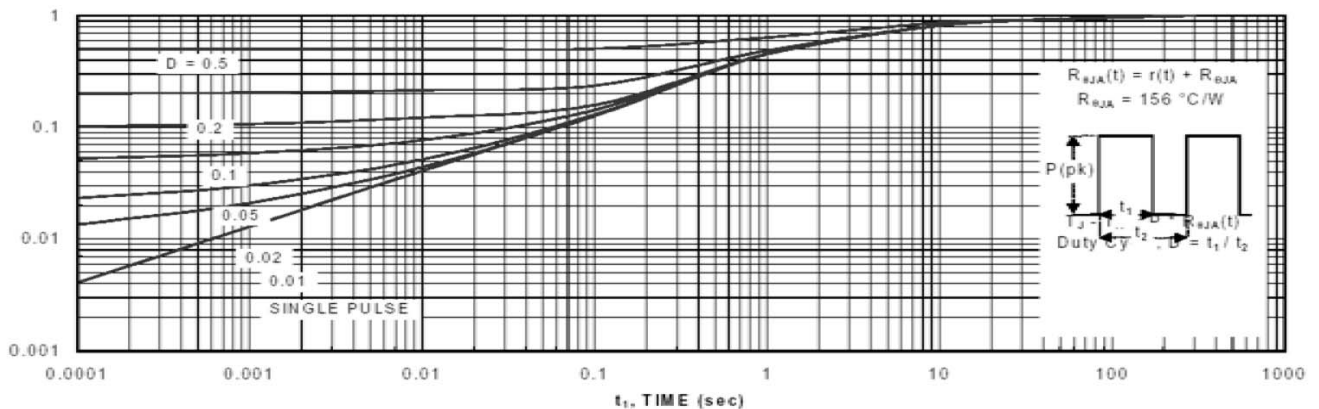


Figure 11. Transient Thermal Response Curve.