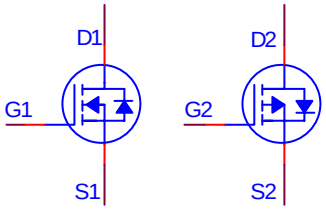
NIKO-SEM

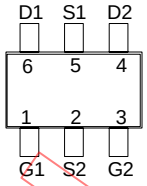
N- & P-Channel Enhancement Mode Field Effect Transistor

P6002OAG
TSOP-6
Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	20	60mΩ	3.6A
P-Channel	-20	115mΩ	-3.1A





G : GATE
D : DRAIN
S : SOURCE

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	N-Channel	P-Channel	UNITS
Drain-Source Voltage		V_{DS}	20	-20	V
Gate-Source Voltage		V_{GS}	±12	±12	V
Continuous Drain Current	T_C = 25 °C	I_D	3.6	-3.1	A
	T_C = 70 °C		2.9	-2.3	
Pulsed Drain Current[1]		I_{DM}	10	-10	
Power Dissipation	T_C = 25 °C	P_D	1.15		W
	T_C = 70 °C		0.73		
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C
Lead Temperature ($^1/_{16}$" from case for 10 sec.)		T_L	275		

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE		SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	t≦5sec	$R_{\theta JA}$		110	°C / W
Junction-to-Ambient	Steady State	$R_{\theta JA}$		150	°C / W
Junction-to-Lead	Steady State	$R_{\theta JL}$		80	°C / W

[1]Pulse width limited by maximum junction temperature.
[2]Duty cycle ≤ 1%

ELECTRICAL CHARACTERISTICS (T_C = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250µA	N-Ch	20			V
		V_{GS} = 0V, I_D = -250µA	P-Ch	-20			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	N-Ch	0.4	0.8	1.2	
		V_{DS} = V_{GS}, I_D = -250µA	P-Ch	-0.4	-0.8	-1.2	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±12V	N-Ch			±100	nA
		V_{DS} = 0V, V_{GS} = ±12V	P-Ch			±100	

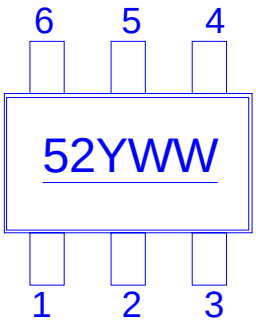
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16V, V_{GS} = 0V	N-Ch			1	μA
		V_{DS} = -16V, V_{GS} = 0V	P-Ch			-1	
		V_{DS} = 16V, V_{GS} = 0V, T_J = 55 °C	N-Ch			10	
		V_{DS} = -16V, V_{GS} = 0V, T_J = 55 °C	P-Ch			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	N-Ch	10			A
		V_{DS} =-5V, V_{GS} = -10V	P-Ch	-10			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 1.8V, I_D = 2A	N-Ch		82	140	mΩ
		V_{GS} = -1.8V, I_D = -1A	P-Ch		214	300	
		V_{GS} = 2.5V, I_D = 3A	N-Ch		60	85	
		V_{GS} = -2.5V, I_D = -2A	P-Ch		125	180	
		V_{GS} = 4.5V, I_D = 3.6A	N-Ch		50	60	
		V_{GS} = -4.5V, I_D = -3.1A	P-Ch		98	115	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 3.6A	N-Ch		10		S
		V_{DS} = -5V, I_D = -3.1A	P-Ch		6		
DYNAMIC							
Input Capacitance	C_{iss}	N-Channel V_{GS} = 0V, V_{DS} = 10V, f = 1MHz P-Channel V_{GS} = 0V, V_{DS} = -10V, f = 1MHz	N-Ch		418		pF
			P-Ch		476		
Output Capacitance	C_{oss}		N-Ch		60		
			P-Ch		260		
Reverse Transfer Capacitance	C_{rss}		N-Ch		42		
			P-Ch		105		
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = 4.5V, I_D = 3.6A P-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -4.5V, I_D = -3.1A	N-Ch		5.4	8.1	nC
			P-Ch		5.6	8.4	
Gate-Source Charge[2]	Q_{gs}		N-Ch		0.7		
			P-Ch		2.3		
Gate-Drain Charge[2]	Q_{gd}		N-Ch		1.7		
			P-Ch		1.5		
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 10V, $I_D \cong$ 1A, V_{GS} = 4.5V, R_{GEN} = 2.5Ω P-Channel V_{DS} = -10V, $I_D \cong$ -1A, V_{GS} = -4.5V, R_{GEN} = 6Ω	N-Ch		2.7		nS
			P-Ch		11		
Rise Time[2]	t_r		N-Ch		2.5		
			P-Ch		32		
Turn-Off Delay Time[2]	$t_{d(off)}$		N-Ch		24		
			P-Ch		38		
Fall Time[2]	t_f		N-Ch		3.2		
			P-Ch		32		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)							
Forward Voltage[1]	V_{SD}	I_F = 0.8A, V_{GS} = 0V	N-Ch			1.2	V
		I_F = -0.8A, V_{GS} = 0V	P-Ch			-1.2	
Reverse Recovery Time	t_{rr}	I_F = 0.8A, dI_F/dt = 100A / µS	N-Ch		40	80	nS
		I_F = -0.8A, dI_F/dt = 100A / µS	P-Ch		40	80	

[1]Pulse test : Pulse Width ≤ 300 µsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature.

REMARK: THIS PRODUCT MARKED WITH "52YWW"

Orders for parts with Lead-Free plating can be placed using the PXXXXXXG parts name.



Marking Description:

5 - N+P MOSFET

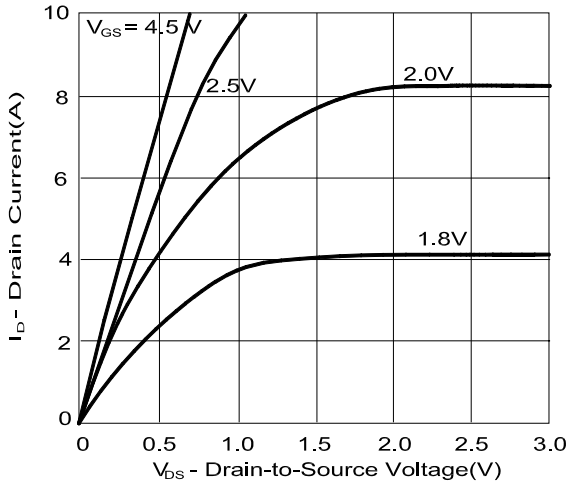
1 - Serial Number

Y - Year

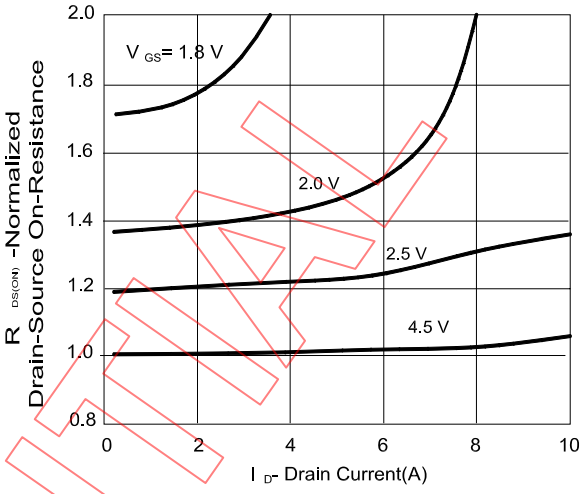
W - Week

N-CHANNEL

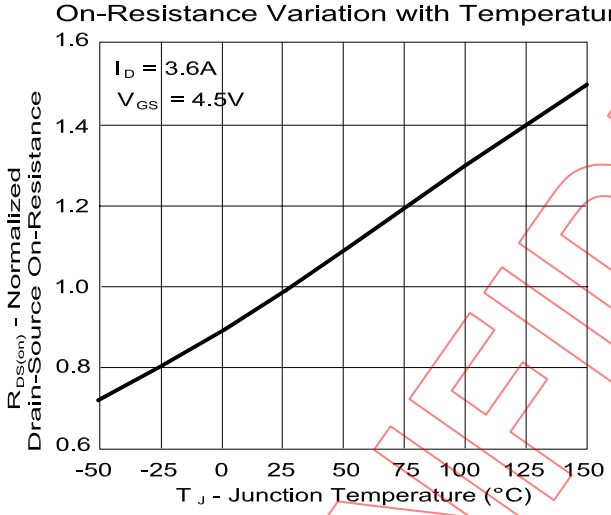
On-Region characteristics



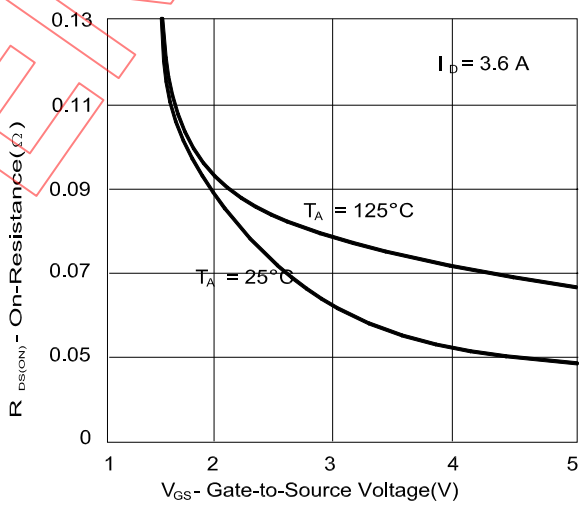
On-Resistance Variation with Drain Current and Gate Voltage



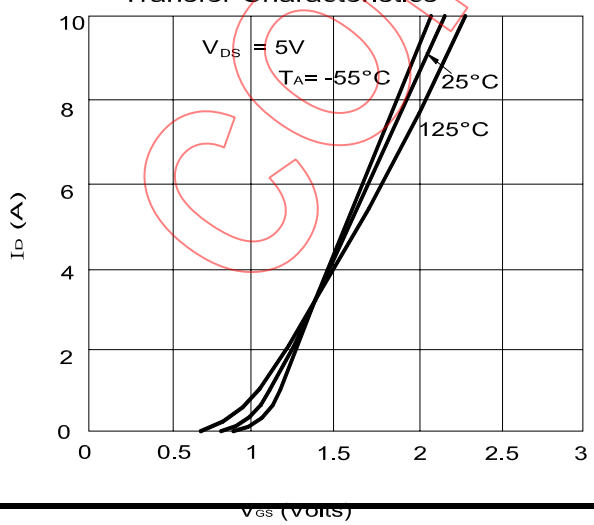
On-Resistance Variation with Temperature



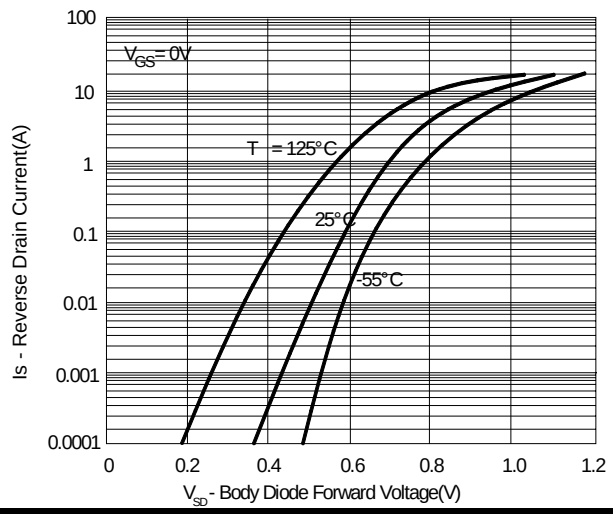
On-Resistance Variation with Gate-to-Source Voltage



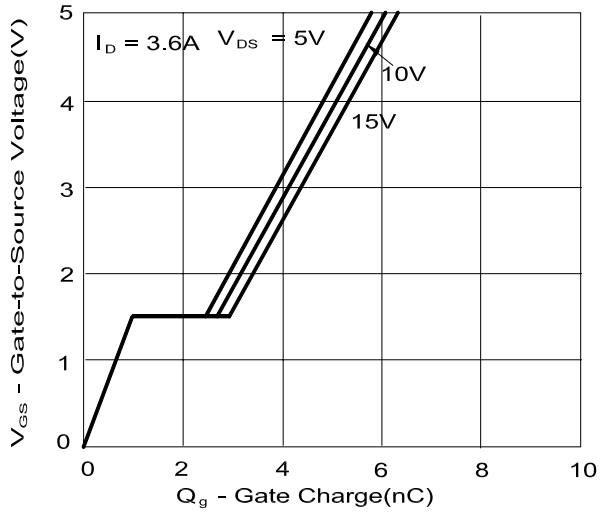
Transfer Characteristics



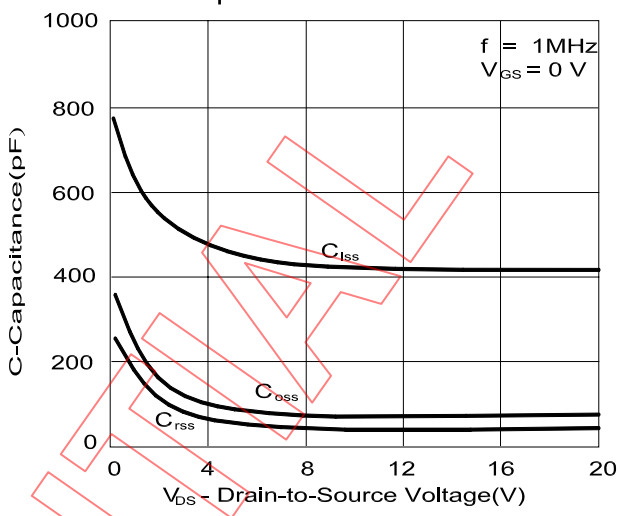
Body Diode Forward Voltage Variation with Source Current and Temperature



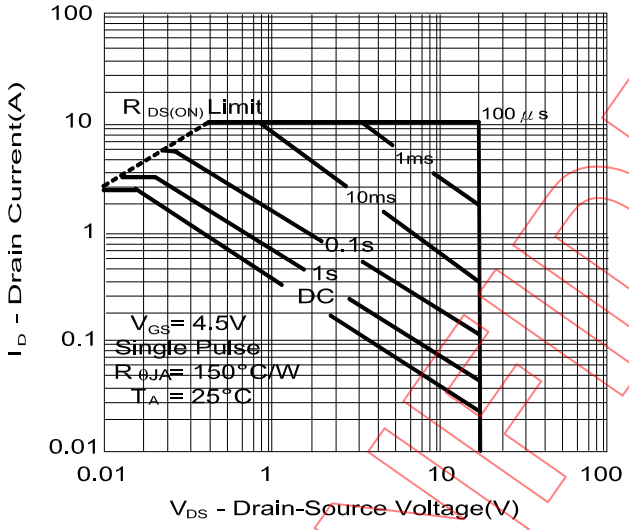
Gate Charge Characteristics



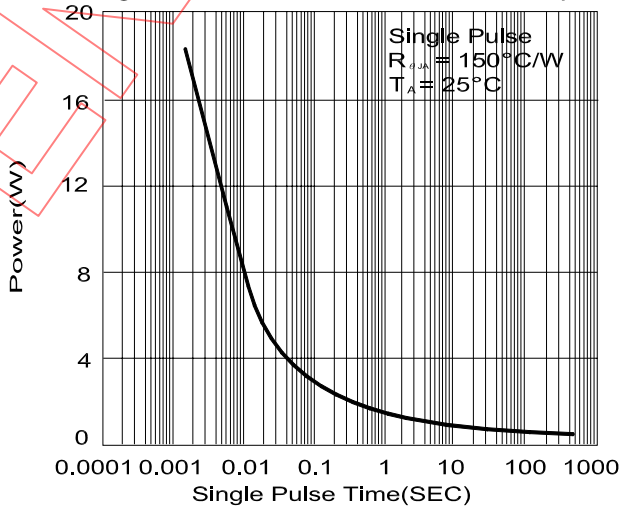
Capacitance Characteristics



Maximum Safe Operating Area

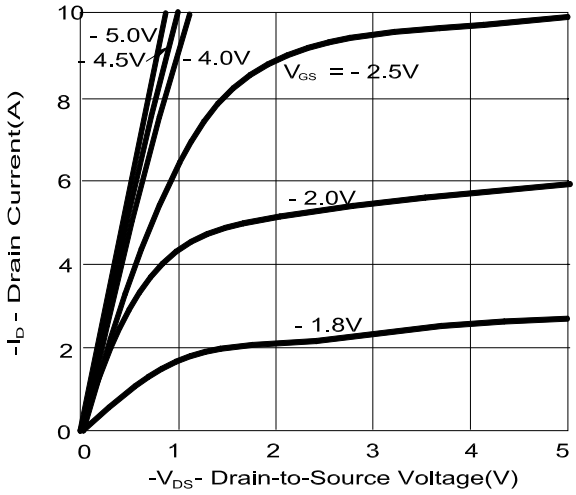


Single Pulse Maximum Power Dissipation

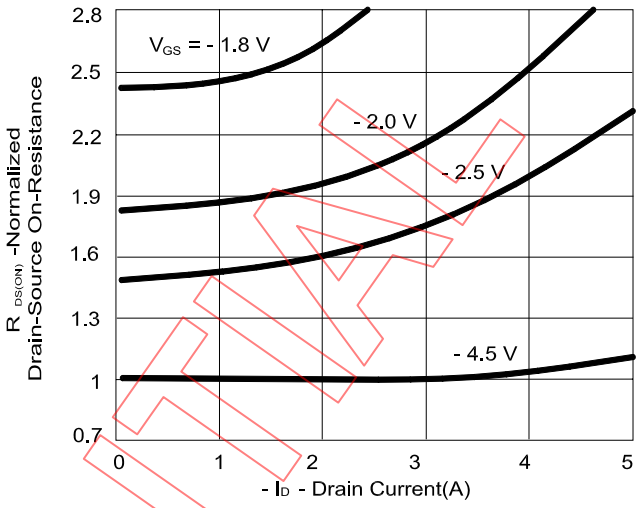


P-CHANNEL

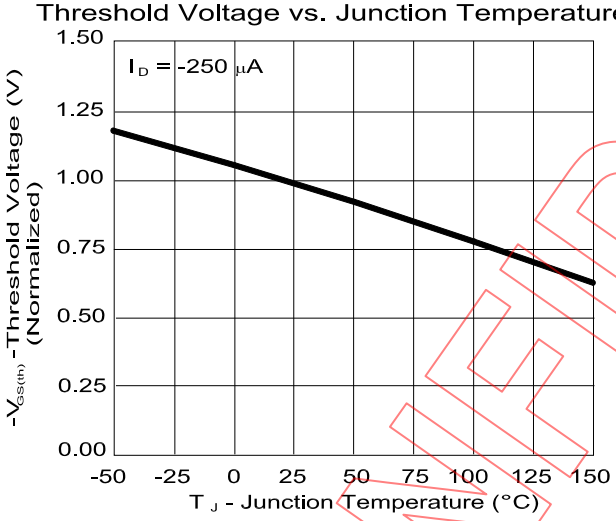
On-Region Characteristics



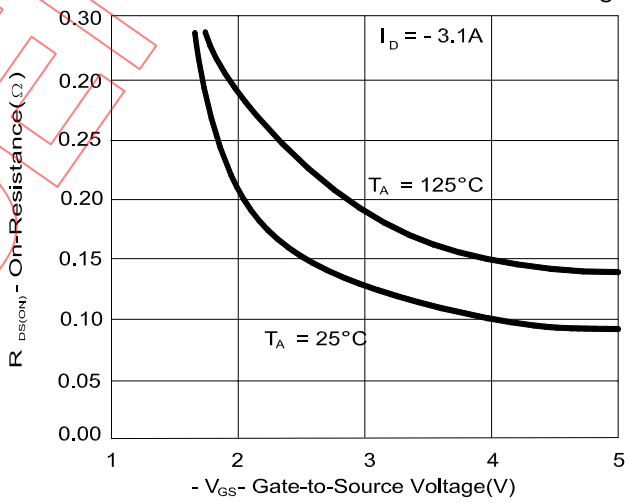
On-Resistance Variation with Drain Current and Gate Voltage



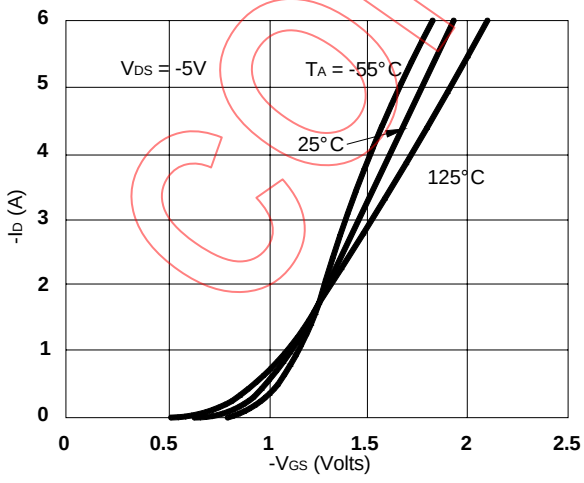
Threshold Voltage vs. Junction Temperature



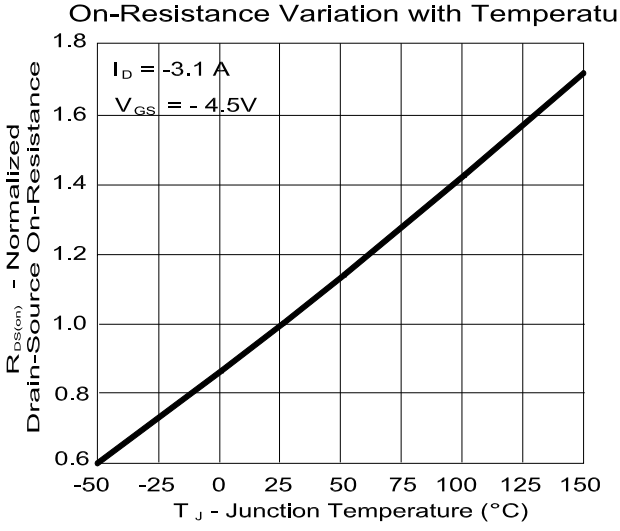
On-Resistance Variation with Gate-to-Source Voltage



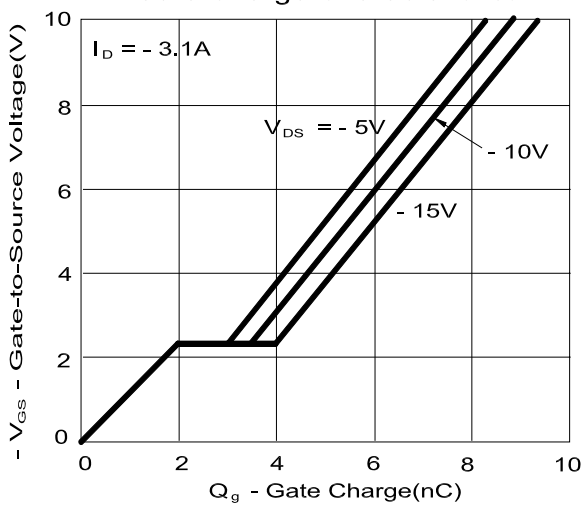
Transfer Characteristics



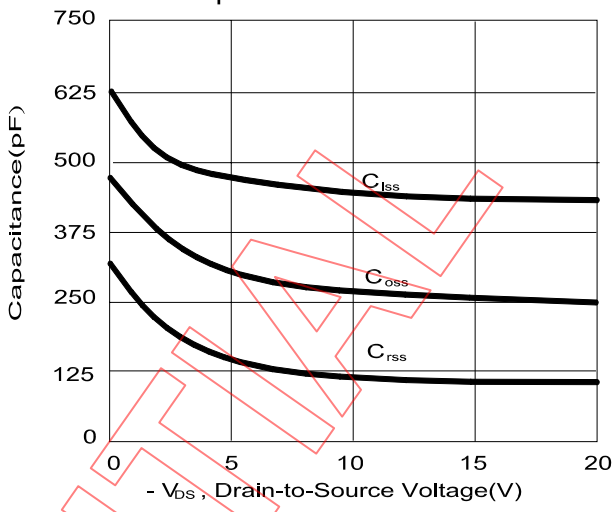
On-Resistance Variation with Temperature



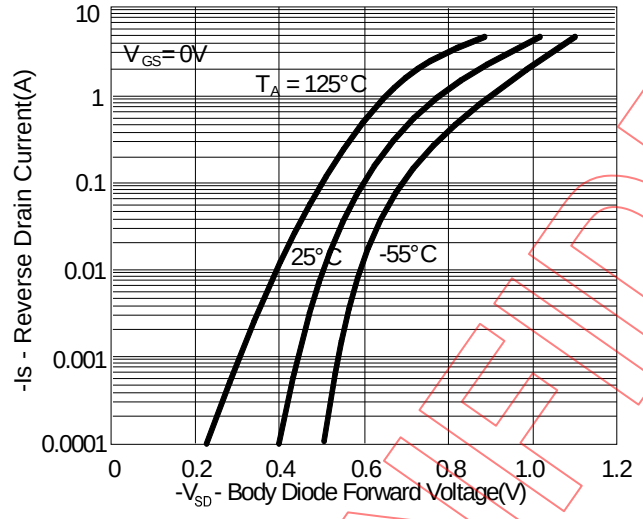
Gate Charge Characteristics



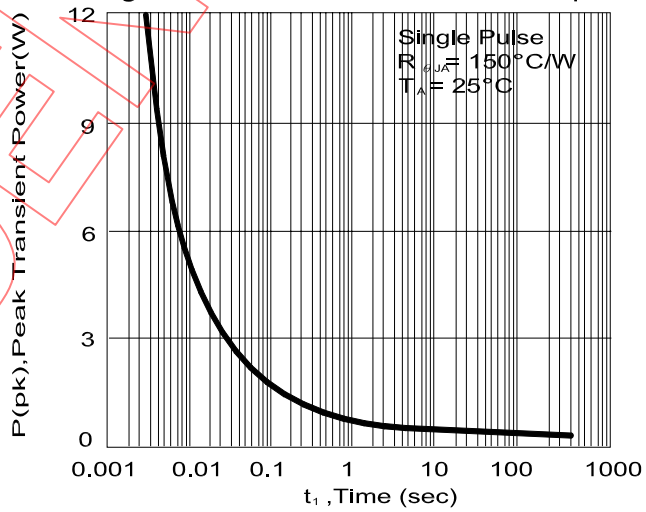
Capacitance Characteristics



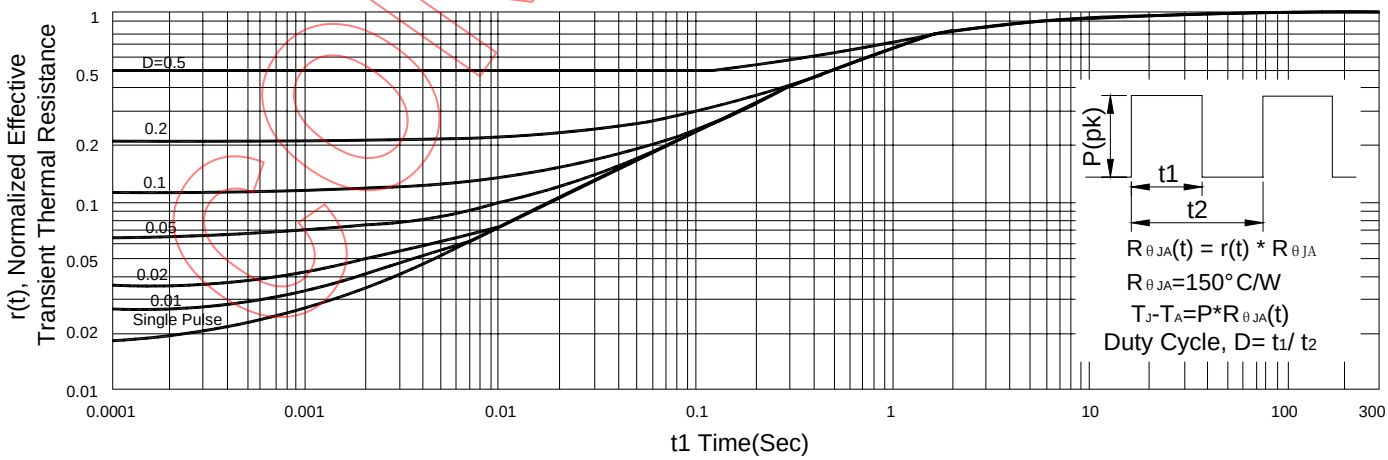
Body Diode Forward Voltage Variation with Source Current and Temperature



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve.



TSOP- 6 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A		0.95		H	0.08	0.13	0.2
B	2.5	2.8	3.1	I	0.3		0.6
C	1.5	1.6	1.7	J			
D	2.7	2.9	3.1	K			
E	0.7		1.2	L			
F	0		0.15	M			
G	0.3	0.4	0.5	N