N -& P-Channel Enhancement Mode Field Effect Transistor

◆ DESCRIPTION

These miniature surface mount MOSFETs utilize High Cell Density process. Low $R_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry.

Typical applications are PWM DC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

◆ FEATURES

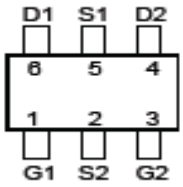
- 30V/3.3A, $R_{DS(ON)}$ = 72mΩ @ V_{GS} = 10V
- 30V/3.3A, $R_{DS(ON)}$ = 125mΩ @ V_{GS} = 4.5V
- -30V/-2.3A, $R_{DS(ON)}$ = 150mΩ @ V_{GS} = -10V
- -30V/-2.3A, $R_{DS(ON)}$ = 280mΩ @ V_{GS} = -4.5V
- Fast switching speed
- TSOP-6 package design

◆ APPLICATIONS

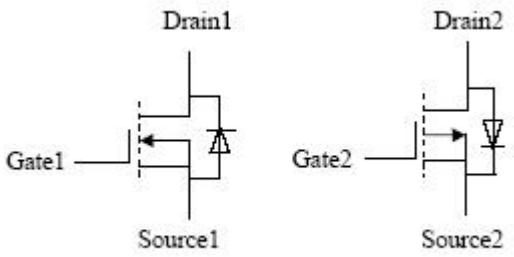
- Inverter
- Synchronous Buck
- DC FAN

◆ PIN CONFIGURATION

TSOP-6 (Top view)



MT6603



◆ ABSOLUTE MAXIMUM RATINGS

(T_A=25 °C Unless Otherwise Noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_A=25 °C	I_D	3.3	-2.3	A
	T_A=70°C		2.6	-1.8	
Pulsed Drain Current [a]		I_{DM}	10	-10	A
Power Dissipation	T_A=25 °C	P_D	1.15	1.15	W
	T_A=70°C		0.73	0.73	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150		°C
Lead Temperature(1/16" from case for 10sec.)		T_L	260		

◆ THERMAL RESISTANCE RATINGS

Thermal Resistance		Symbol	Maximum	Unit
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
Junction-to-Case	Steady State	$R_{\theta JC}$	62	°C/W

Note :

1. Pulse width limited by maximum junction temperature.

◆ ELECTRICAL CHARACTERISTICS

(T_A=25°C Unless Otherwise Noted)

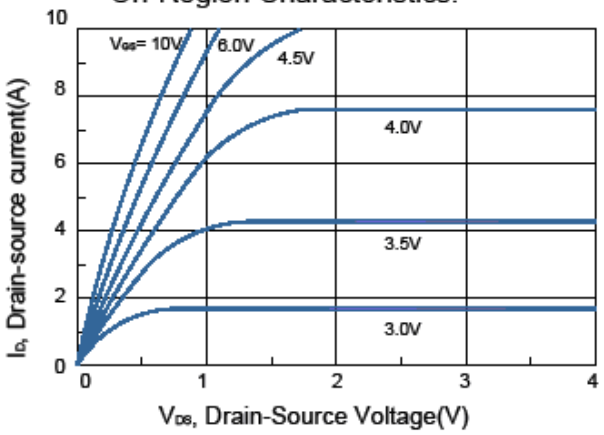
Parameter	Symbol	Test Conditions	Limits				Unit
			Ch	Min	Typ	Max	
Static							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	N	30	-	-	V
		V_{GS} = 0V, I_D = -250μA	P	-30	-	-	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N	1	1.5	2.5	V
		V_{DS} = V_{GS}, I_D = -250μA	P	-1	-1.5	-2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	N	-	-	±100	nA
		V_{DS} = 0V, V_{GS} = ±20V	P	-	-	±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	N	-	-	1	uA
		V_{DS} = -24V, V_{GS} = 0V	P	-	-	-1	
		V_{DS} = 20V, V_{GS} = 0V, T_J = 55 °C	N	-	-	10	uA
		V_{DS} = -20V, V_{GS} = 0V, T_J = 55 °C	P	-	-	-10	uA
On-State Drain Current [1]	$I_{D(on)}$	V_{DS} = 5V, V_{GS} = 10V	N	8	-	-	A
		V_{DS} =-5V, V_{GS} = -10V	P	-8	-	-	
Drain-Source On-Resistance[1]	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 2A	N	-	69	125	mΩ
		V_{GS} = -4.5V, I_D = -1.5A	P	-	145	280	
		V_{GS} = 10V, I_D = 3.3A	N	-	50	72	
		V_{GS} = -10V, I_D = -2.3A	P	-	95	150	
Forward Tranconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 2.5A	N	-	4.5	-	S
		V_{DS} = -5V, I_D = -2A	P	-	3	-	
Dynamic							
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = 10V, I_D = 3.3A P-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V,I_D = -2A	N	-	2.6	3.9	nC
			P	-	2.8	4.2	
Gate-Source Charge[2]	Q_{gs}		N	-	0.9	-	
			P	-	1.0	-	
Gate-Drain Charge[2]	Q_{gd}		N	-	0.6	-	
			P	-	0.7	-	
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 15V, R_L = 15Ω I_D □ 1A, V_{GS} = 10V, R_{GEN} =6Ω P-Channel V_{DS} = -15V, R_L = 15Ω I_D □ -1A, V_{GS} = -10V, R_{GEN} = 6Ω	N	-	7	11	nS
			P	-	8	12	
Rise Time[2]	t_r		N	-	12	18	
			P	-	11	18	
Turn-Off Delay Time[2]	$t_{d(off)}$		N	-	12	18	
			P	-	14	21	
Fall-Time[2]	t_f		N	-	7	11	
			P	-	8	12	

Input Capacitance	Ciss	N-Channel V_{GS}=0V, V_{DS}= 15V , f =1MHz P-Channel V_{GS}=0V, V_{DS} = -15V, f =1MHz	N	-	202	-	pF
			P	-	225	-	
Output Capacitance	Coss		N	-	40	-	
			P	-	60	-	
ReverseTransfer Capacitance	Crss		N	-	20	-	
			P	-	30	-	
Source-Drain Diode Ratings and Characteristics (Tc=25℃)							
Forward Voltage[1]	V_{SD}	I_F = 0.8A, V_{GS} = 0V	N	-	-	1.2	V
		I_F = -0.8A, V_{GS} = 0V	P	-	-	-1.2	
Reverse Recovery Time	trr	I_F = 0.8A, dIF/dt = 100A / μS	N	-	40	80	nS
		I_F = -0.8A, dIF/dt = 100A / μS	P	-	40	80	

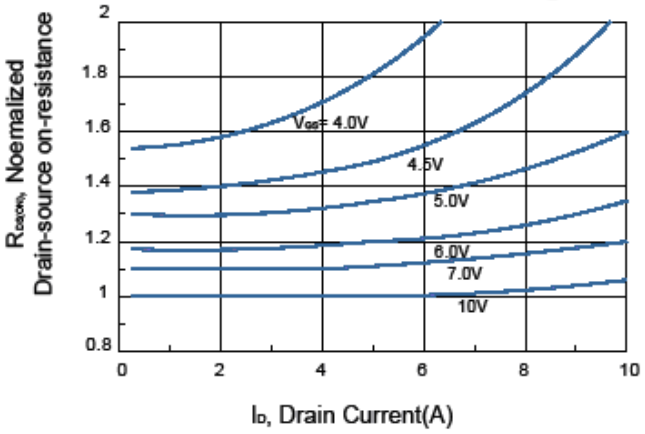
1. Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
2. Independent of operating temperature.

◆ TYPICAL CHARACTERICTICS (N-Channel)

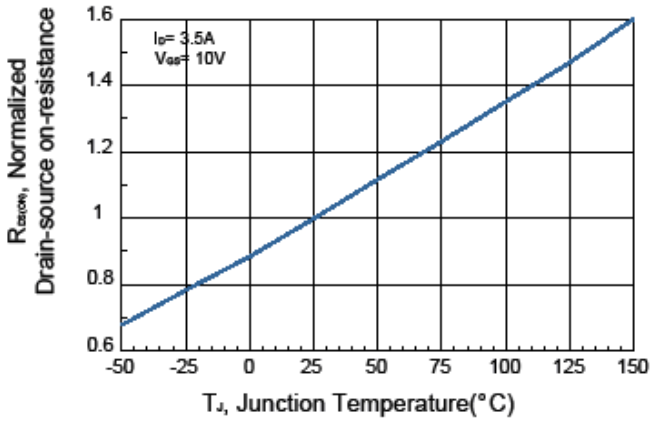
On-Region Characteristics.



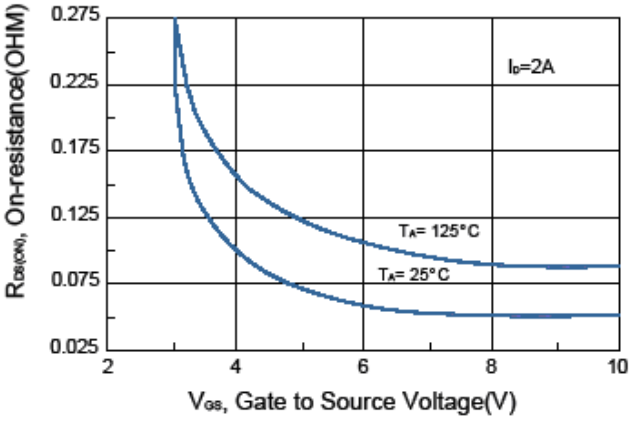
On-Resistance Variation with Drain Current and Gate Voltage.



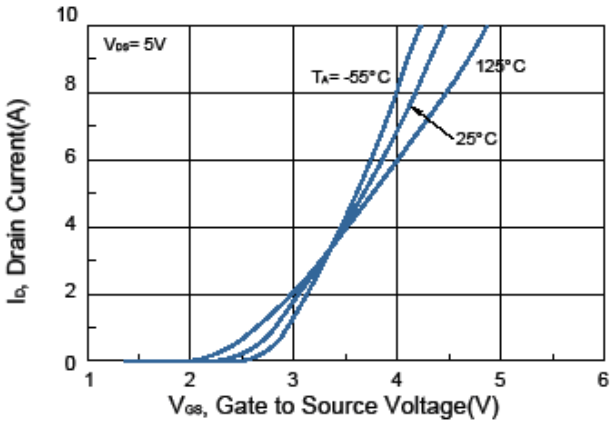
On-Resistance Variation with Temperature.



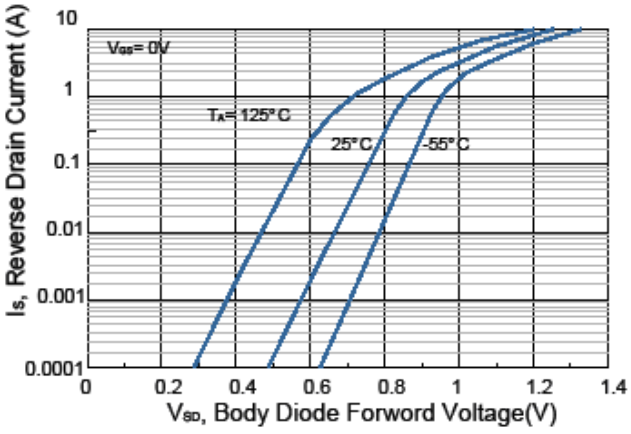
On-Resistance Variation with Gate-to-Source Voltage.



Transfer Characteristics.



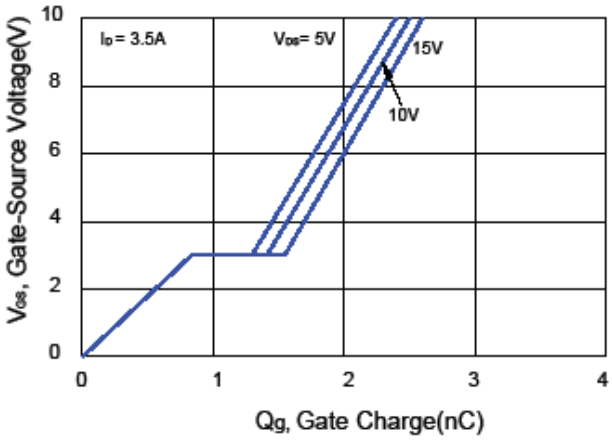
Body Diode Forword Voltage Variation with Source Current and Temperature.



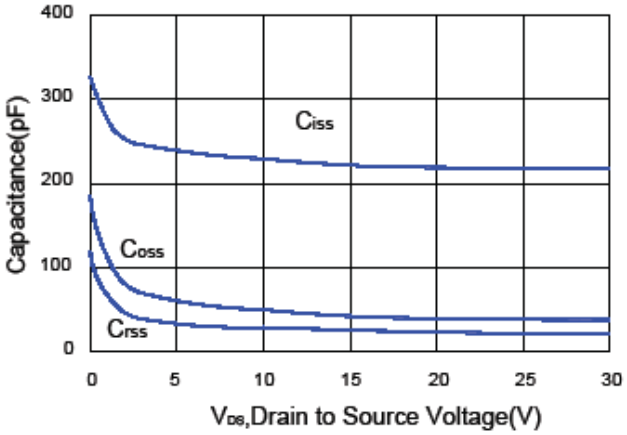
N -& P-Channel Enhancement Mode Field Effect Transistor

◆ TYPICAL CHARACTERICTICS (N-Channel)

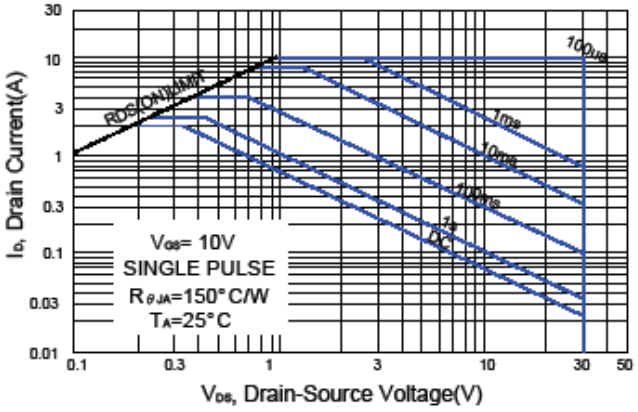
Gate-Charge Characteristics



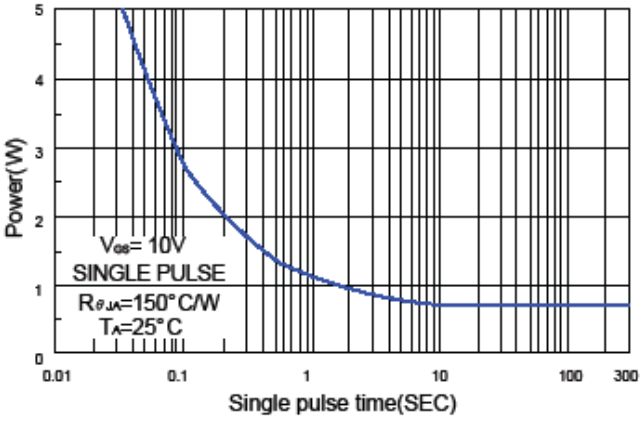
Capacitance Characteristics



Maximum Safe Operating Area.

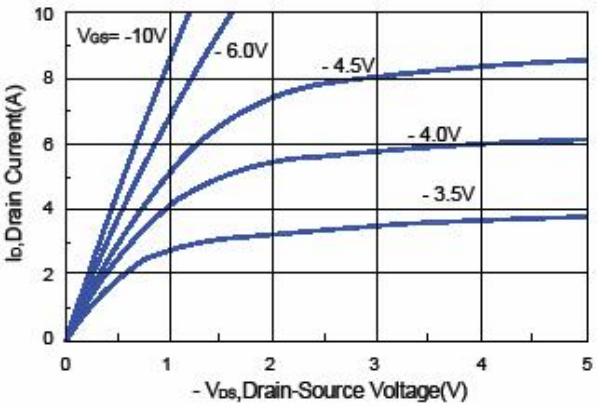


Single Pulse Maximum Power Dissipation.

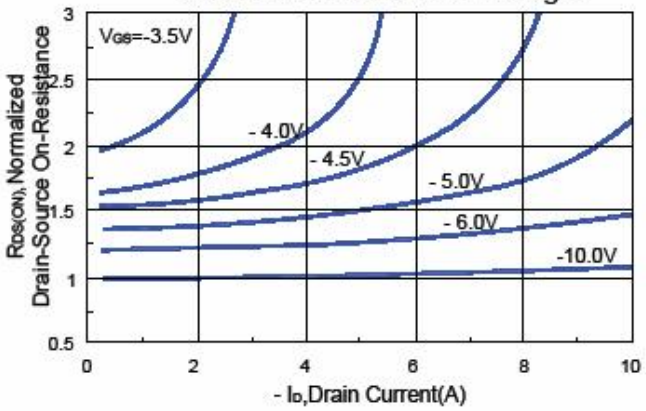


◆ TYPICAL CHARACTERICTICS (P-Channel)

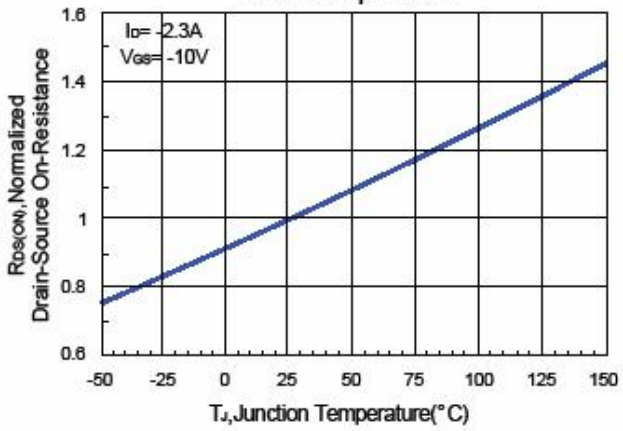
On-Region Characteristics



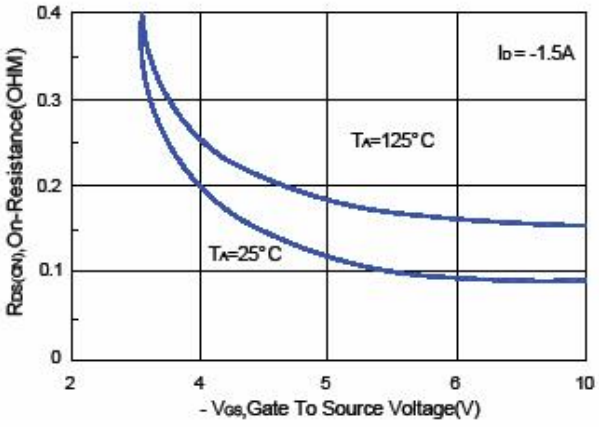
On-Resistance Variation with Drain Current and Gate Voltage.



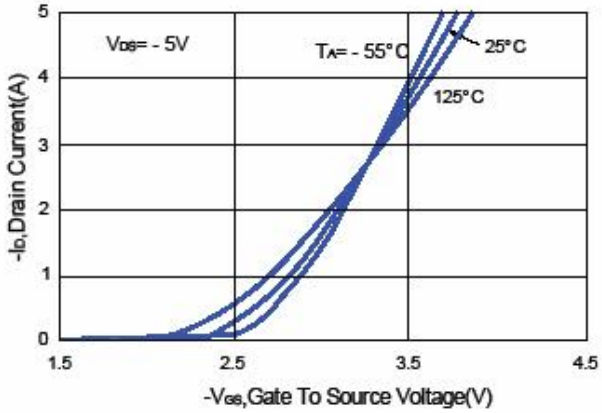
On-Resistance Variation with Temperature



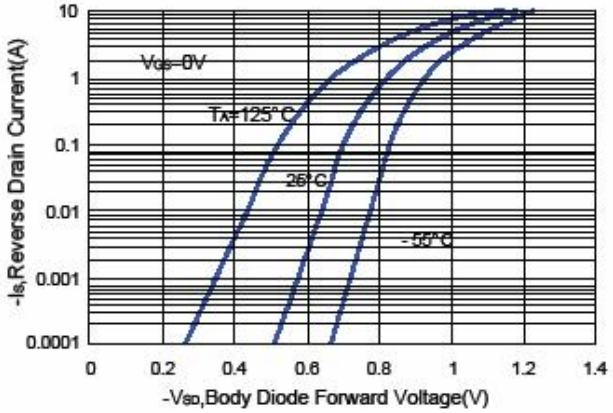
On-Resistance Variation with Gate-to-Source Voltage.



Transfer Characteristics

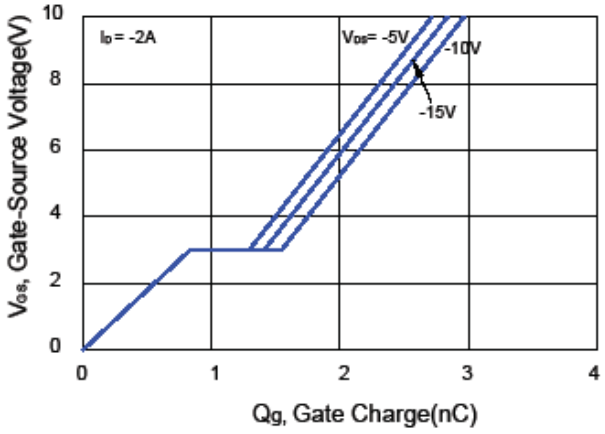


Body Diode Forward Voltage Variation With Source Current and Temperature.

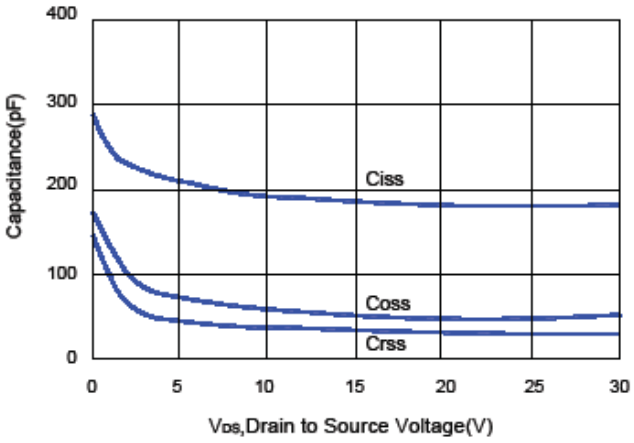


◆ TYPICAL CHARACTERICTICS (P-Channel)

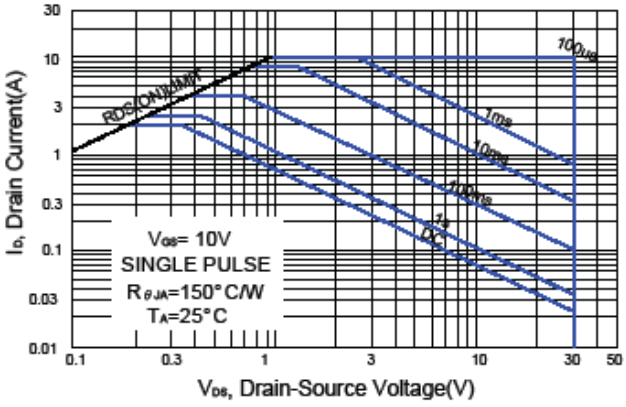
Gate-Charge Characteristics



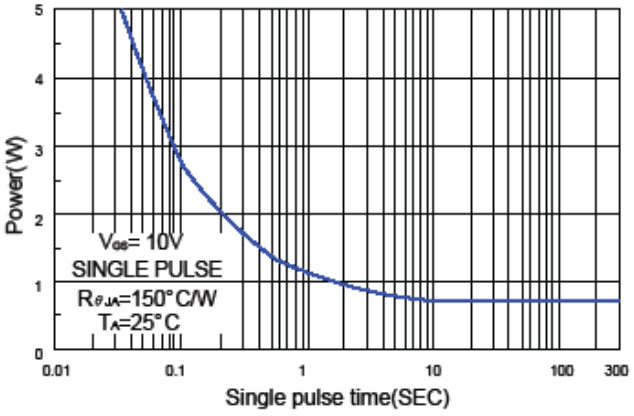
Capacitance Characteristics



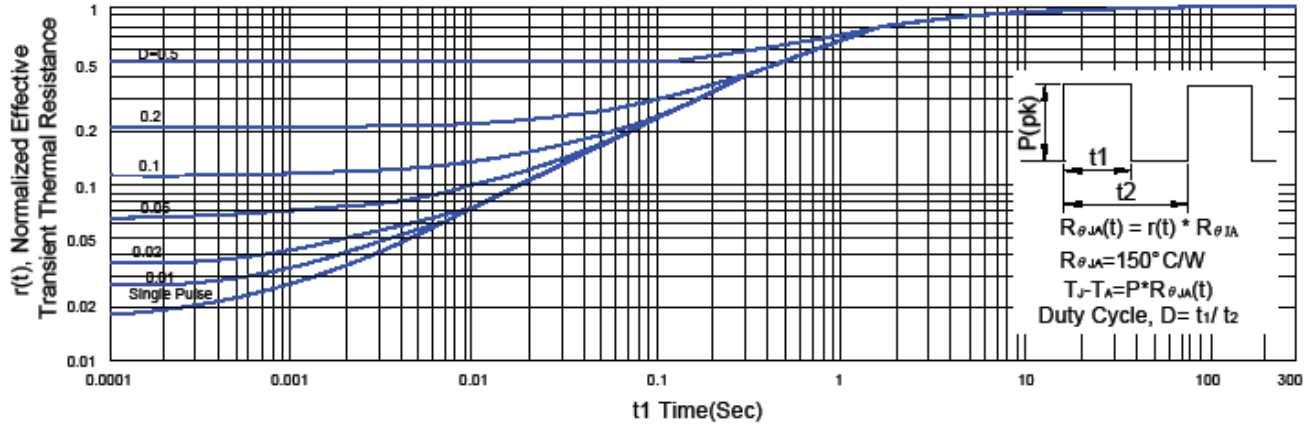
Maximum Safe Operating Area.



Single Pulse Maximum Power Dissipation.



Transient Thermal Response Curve.



◆ PHYSICAL DIMENSIONS

TSOP-6

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