P & N-Channel 30-V(D-S) MOSFET

◆ 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.

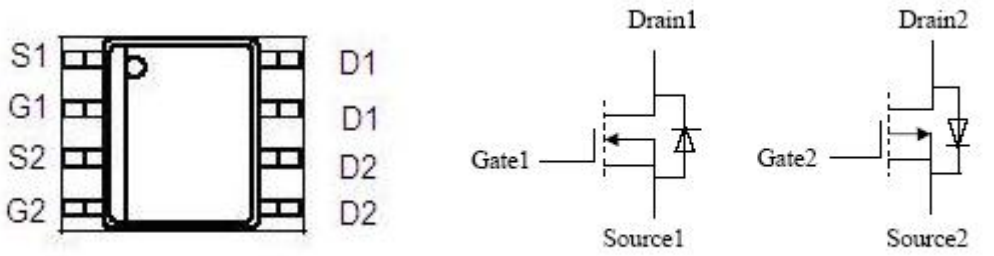
◆ FEATURES

- 30V/7A, $R_{DS(ON)}$ = 21mΩ @ V_{GS} = 10V
- 30V/6A, $R_{DS(ON)}$ = 31mΩ @ V_{GS} = 4.5V
- -30V/-6A, $R_{DS(ON)}$ = 35mΩ @ V_{GS} = -10V
- -30V/-5A, $R_{DS(ON)}$ = 55mΩ @ V_{GS} = -4.5V
- Fast switching speed
- SOP-8 package design

◆ APPLICATIONS

- Inverter
- Synchronous Buck
- DC FAN

◆ PIN CONFIGURATION



◆ 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 [a]	T_A=25°C	I_D	7	-6	A
	T_A=70°C		6	-5	
Pulsed Drain Current [b]		I_{DM}	+30	-30	A
Power Dissipation [a]	T_A=25°C	P_D	2.1	2.1	W
	T_A=70°C		1.3	1.3	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150		°C

◆ THERMAL RESISTANCE RATINGS

Thermal Resistance	Symbol	Maximum	Unit
Maximum Junction-to-Ambient [a]	$R_{\theta JA}$	62.5	°C/W
Thermal resistance junction to case	θ_{JC}	40	°C/W

Note :

a. Surface Mounted on 1” x 1” FR4 Board.

b. Pulse width limited by maximum junction temperature

◆ ORDERING INFORMATION

Device	Package	Shipping
MT3047EM	SOP-8	2500 PCS / Tape & Reel

◆ ELECTRICAL CHARACTERISTICS

(T_A=25°C Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Limits				Unit
			Ch	Min	Typ	Max	
Static							
Gate-Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 250 uA	N	1	-	3	V
		V_{GS} = V_{DS}, I_D = -250 uA	P	-1	-	-3	
Gate-Body Leakage	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V	P	-	-	±100	nA
		V_{GS} = ±20 V, V_{DS} = 0 V	N	-	-	±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -30 V, V_{GS}= 0 V	P	-	-	-1	uA
		V_{DS} = 30 V, V_{GS} = 0 V	N	-	-	1	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	N	30	-	-	A
		V_{DS} = -5 V, V_{GS} = -10 V	P	-30	-	-	
Drain-Source On-Resistance [a]	$R_{DS(on)}$)	V_{GS}= 10 V, I_D= 7 A	N	-	-	21	mΩ
		V_{GS}= 4.5 V, I_D= 6 A		-	-	31	
		V_{GS}= -10 V, I_D= -6 A	P	-	-	35	
		V_{GS}= -4.5 V, I_D= -5 A		-	-	55	
Forward Tranconductance a	g_{fs}	V_{DS}= 10 V, I_D= 5 A	N	-	4.6	-	S
		V_{DS}= -10 V, I_D= -5 A	P	-	4.9	-	
Dynamic							
Total Gate Charge	Q_g	N-Channel V_{DS}=24V, V_{GS}=4.5V, I_D=7A P-Channel V_{DS}=-24V, V_{GS}=-4.5V, I_D=-6A	N	-	10	-	nC
			P	-	9	-	
Gate-Source Charge	Q_{gs}		N	-	2	-	
			P	-	2	-	
Gate-Drain Charge	Q_{gd}		N	-	6	-	
			P	-	6	-	
Input Capacitance	C_{iss}	N-Channel V_{DS}=10V, V_{GS}=0V, f=1MHz P-Channel V_{DS}=-10V, V_{GS}=0V, f=1MHz	N	-	1700	-	pF
			P	-	970	-	
Output Capacitance	C_{oss}		N	-	380	-	
			P	-	370	-	
Reverse Transfer Capacitance	C_{rss}		N	-	260	-	
			P	-	180	-	
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD}=15V, V_{GS}=10V, I_D=1A , R_{GEN}=3.3Ω, P-Channel V_{DD}=-15V, V_{GS}=-10V, I_D=-1A ,R_{GEN}=3.3Ω	N	-	8	-	nS
			P	-	10	-	
Rise Time	t_r		N	-	7	-	
			P	-	8	-	
Turn-Off Delay Time	$t_{d(off)}$		N	-	20	-	
			P	-	25	-	
Fall-Time	t_f		N	-	6	-	
			P	-	13	-	

◆ ELECTRICAL CHARACTERISTICS (Continue)

(T_A=25°C Unless Otherwise Noted)

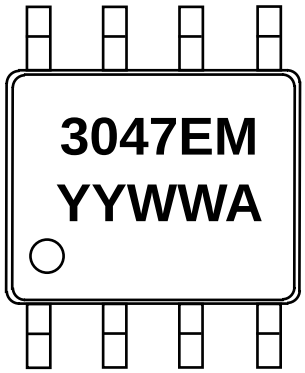
Source-Drain Diode							
Max. Diode Forward Current	Is		N	-	-	4.3	A
			P	-	-	-2.6	
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0	N	-	-	1	V
		I_S = -2.6 A, V_{GS} = 0	P	-	-	-1.3	

Note :

a. Pulse test: PW<=300us duty cycle <=2%

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

◆ MARKING INFORMATION



3047EM : Device Name

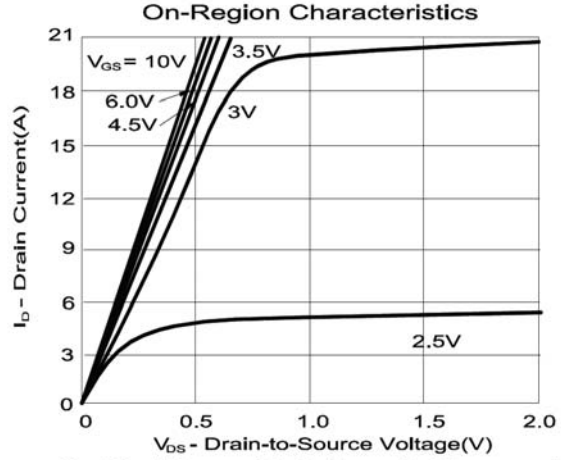
YY : Year

WW : Weekly

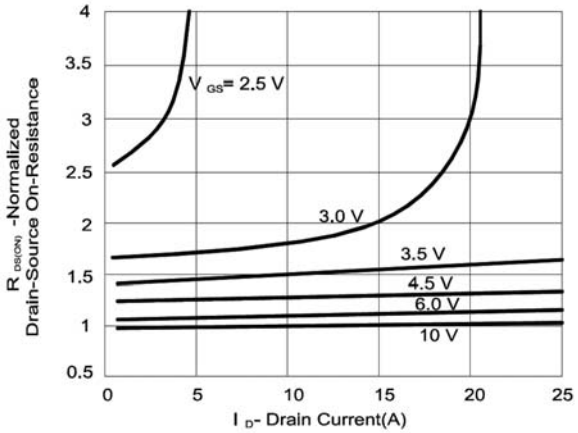
A : A/T Site Code

◆ TYPICAL CHARACTERICTICS (N-Channel)

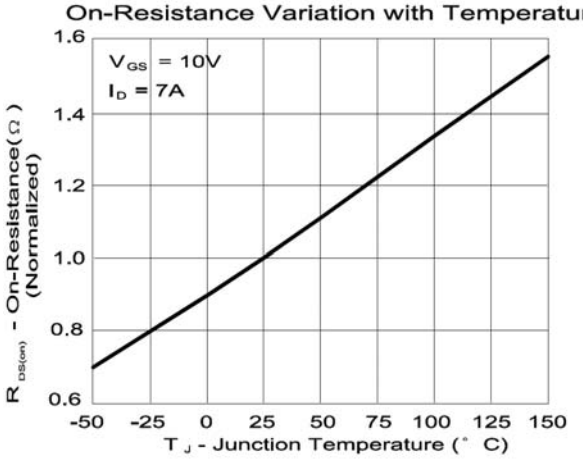
On-Region Characteristics



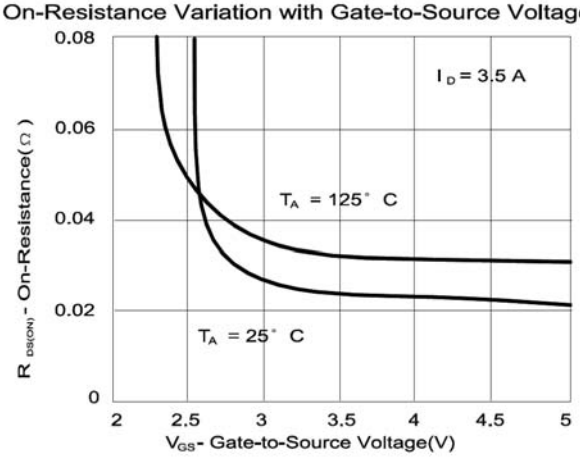
On-Resistance Variation with Drain Current and Gate Voltage



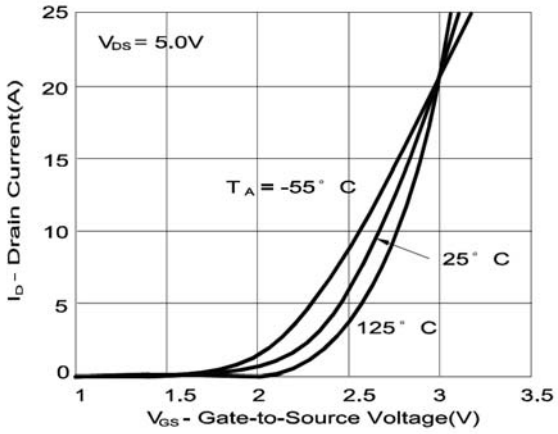
On-Resistance Variation with Temperature



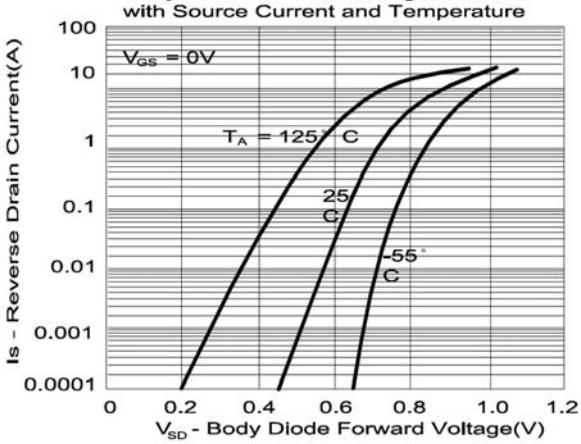
On-Resistance Variation with Gate-to-Source Voltage



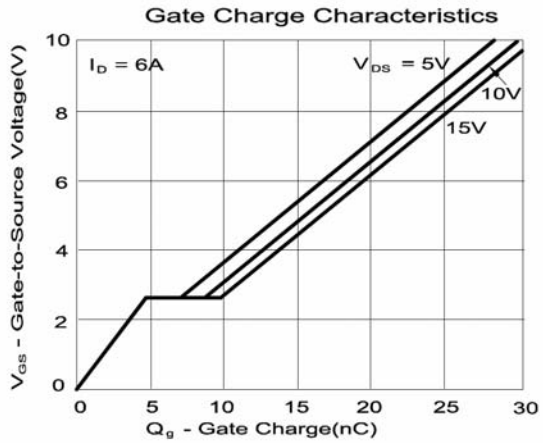
Transfer Characteristics

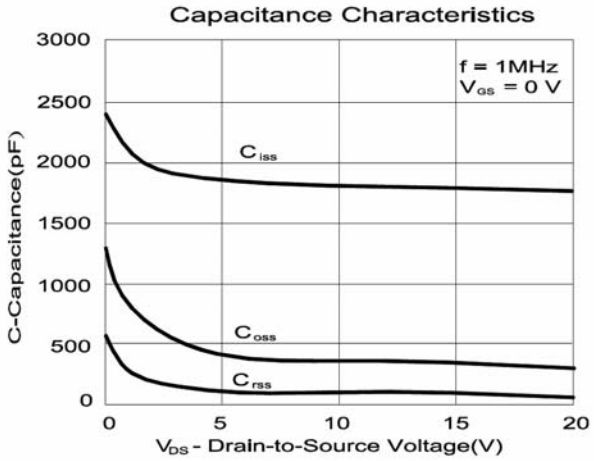


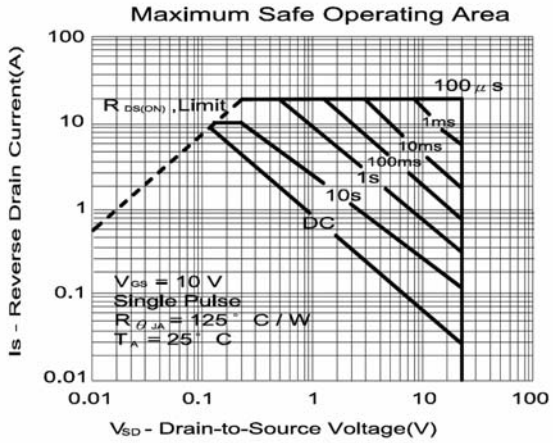
Body Diode Forward Voltage Variation with Source Current and Temperature

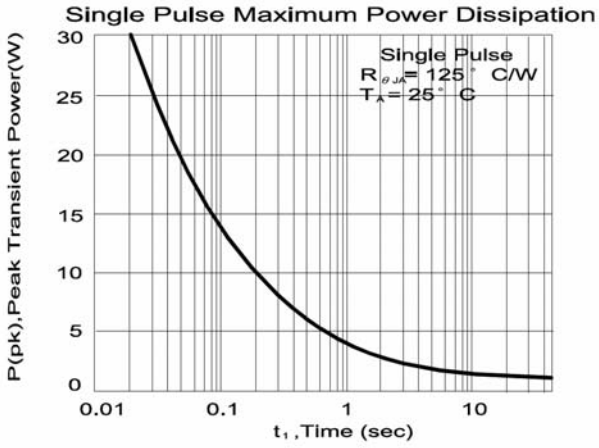


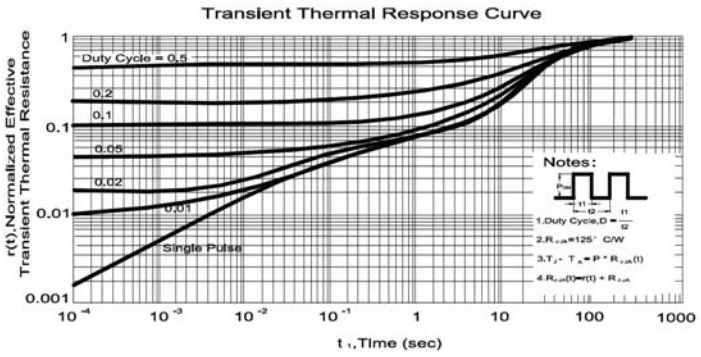
◆ TYPICAL CHARACTERICTICS (N-Channel)

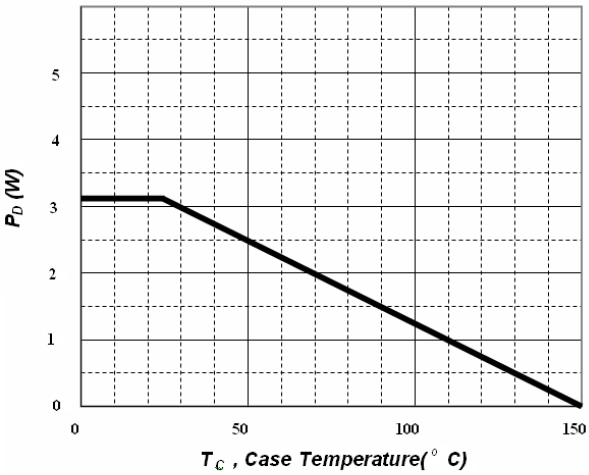








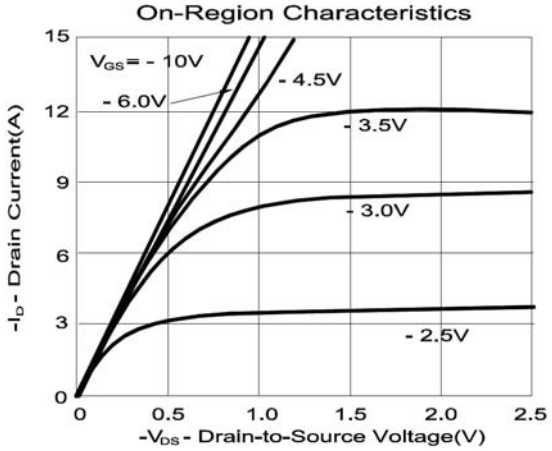




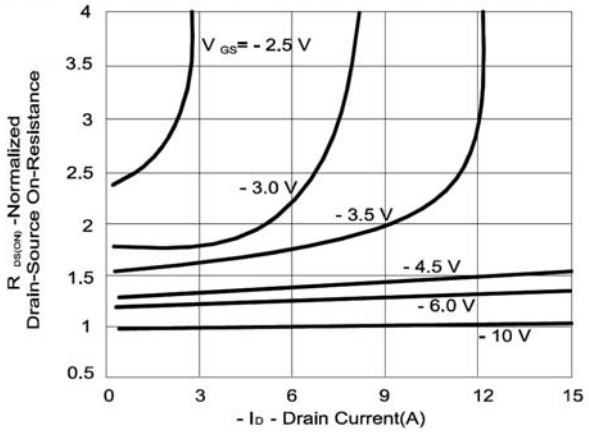
N-channel Power Dissipation (P_D vs. T_C)

◆ TYPICAL CHARACTERICTICS (P-Channel)

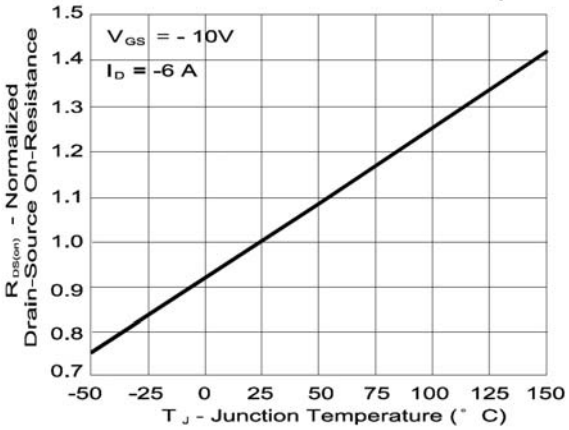
On-Region Characteristics



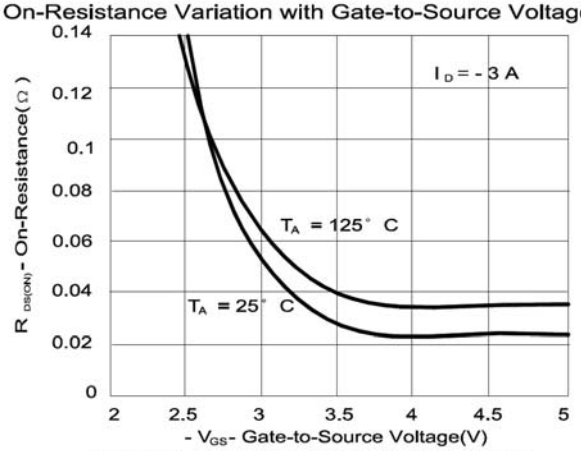
On-Resistance Variation with Drain Current and Gate Voltage



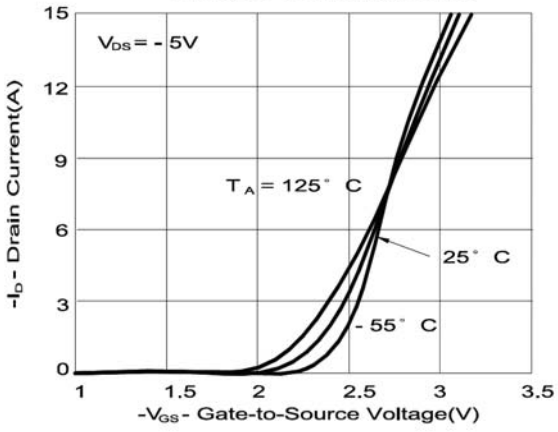
On-Resistance Variation with Temperature



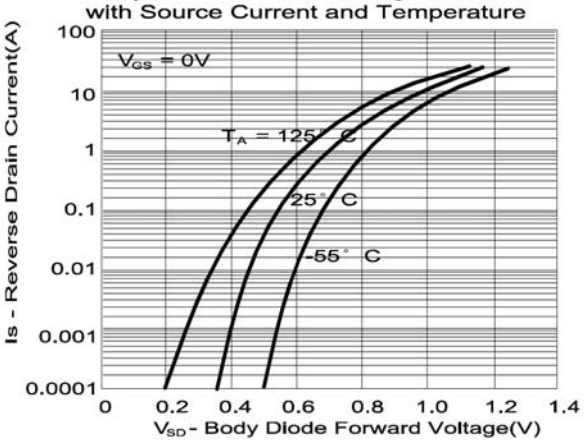
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics

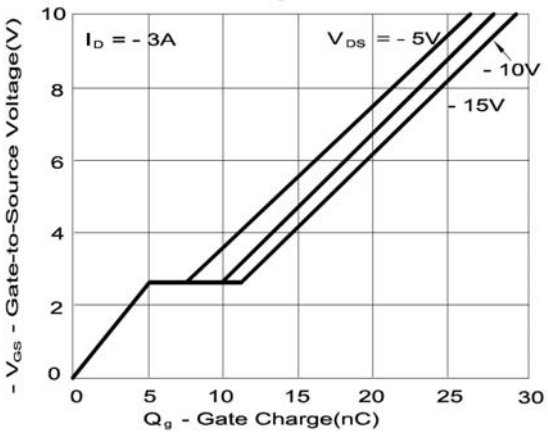


Body Diode Forward Voltage Variation with Source Current and Temperature

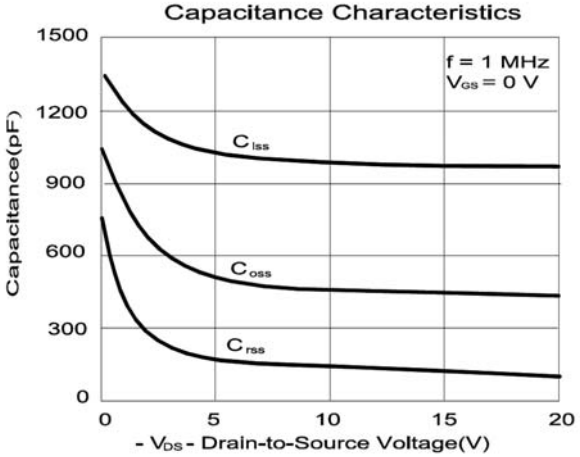


◆ TYPICAL CHARACTERICTICS (P-Channel)

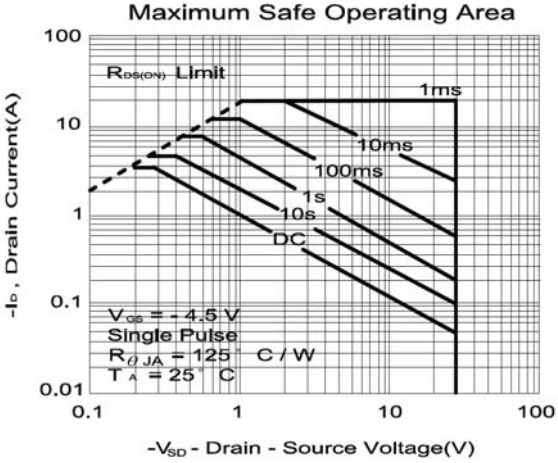
Gate Charge Characteristics



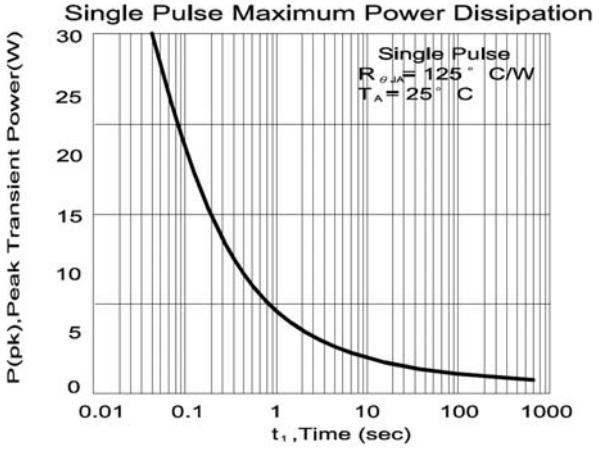
Capacitance Characteristics



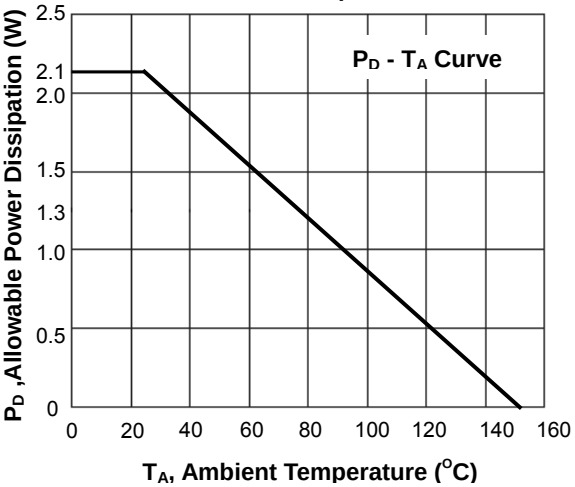
Maximum Safe Operating Area

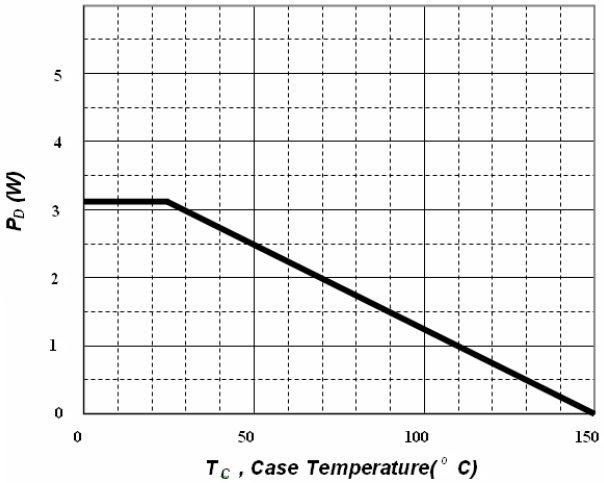


Single Pulse Maximum Power Dissipation



Total Dissipation

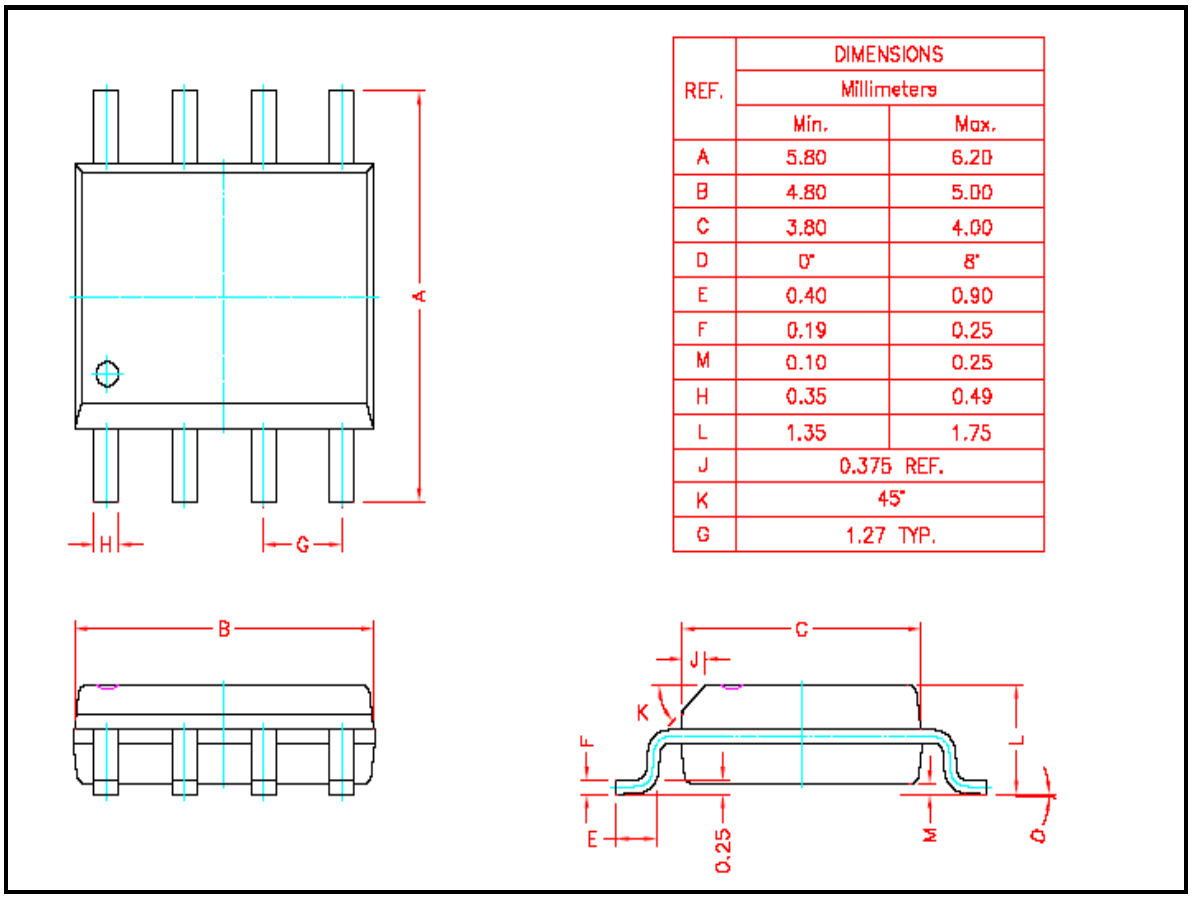




P-channel Power Dissipation (P_D vs. T_C)

◆ PHYSICAL DIMENSIONS

8-Pin Plastic S.O.I.C.



REF.	DIMENSIONS Millimeters	
	Min.	Max.
A	5.80	6.20
B	4.80	5.00
C	3.80	4.00
D	0°	8°
E	0.40	0.90
F	0.19	0.25
M	0.10	0.25
H	0.35	0.49
L	1.35	1.75
J	0.375 REF.	
K	45°	
G	1.27 TYP.	