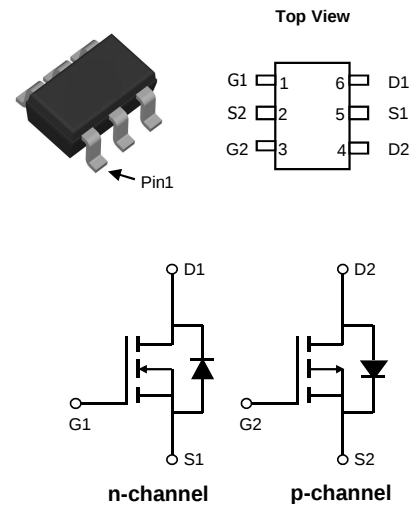


**N And P-Channel Enhancement Mode Power MOSSFET****Features**

- Advanced trench process technology
- High Density Cell Design For Ultra Low On-Resistance

**Order Information**

Product	Package	Marking	Packing	Min Unit Quantity
PTL04C02	SOT-23-6	04C02	3000PCS/Reel	3000PCS

Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter		Rating		Unit
			NMOS	PMOS	
Common Ratings (TC=25°C Unless Otherwise Noted)					
V _{GS}	Gate-Source Voltage		±12	±12	V
V _{(BR)DSS}	Drain-Source Breakdown Voltage		20	-20	V
T _J	Maximum Junction Temperature		150		°C
T _{STG}	Storage Temperature Range		-50 to 150		°C
I _S	Diode Continuous Forward Current	T _C =25°C	3	-3	A
Mounted on Large Heat Sink					
I _{DM}	Pulse Drain Current Tested	T _C =25°C	12	-12	A
I _D	Continuous Drain Current(V _{GS} =10V)	T _C =25°C	3	-3	A
P _D	Maximum Power Dissipation	T _C =25°C	0.8	0.8	W
R _{θJA}	Thermal Resistance Junction-Ambient		78		°C/W



N And P-Channel Enhancement Mode Power MOSFET

N-Channel

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	20	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current (T _c =25°C)	V _{DS} =20V,V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V,V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =250μA	0.45	--	1.2	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =3A	--	--	30	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =3.3V, I _D =3A	--	--	35	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =2.5V, I _D =2A	--	--	40	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =10V,V _{GS} =0V, f=1MHz	--	280	--	pF
C _{oss}	Output Capacitance		--	48	--	pF
C _{rss}	Reverse Transfer Capacitance		--	28	--	pF
Q _g	Total Gate Charge	V _{DS} =10V,I _D =3A, V _{GS} =4.5V	--	3	--	nC
Q _{gs}	GateSource Charge		--	0.6	--	nC
Q _{gd}	GateDrain Charge		--	0.8	--	nC
Switching Characteristics						
t _{d(on)}	Turnon Delay Time	V _{DD} =10V, R _L =3.3Ω, R _G =6Ω, V _{GEN} =4.5V	--	7	--	ns
t _r	Turnon Rise Time		--	15	--	ns
t _{d(off)}	TurnOff Delay Time		-	38	--	ns
t _f	TurnOff Fall Time		--	3	--	ns
Source Drain Diode Characteristics						
I _S	Max. Diode Forward Current		--	--	3	A
V _{SD}	Forward on voltage	I _S =2.2 A, V _{GS} =0V	--	--	1.2	V

Notes: Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.



N And P-Channel Enhancement Mode Power MOSFET

P-Channel

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-20	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current (Tc=25°C)	V _{DS} =-20V, V _{GS} =0V	--	--	-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.4	--	-1.0	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-3A	--	--	75	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-3.3V, I _D =-3A	--	--	85	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-2.5V, I _D =-2A	--	--	95	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	--	328	--	pF
C _{oss}	Output Capacitance		--	65	--	pF
C _{rss}	Reverse Transfer Capacitance		--	39	--	pF
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-3A, V _{GS} =-4.5V	--	3.3	--	nC
Q _{gs}	Gate-Source Charge		--	0.7	--	nC
Q _{gd}	Gate-Drain Charge		--	1.1	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-10V, R _L =5Ω, R _{GEN} =3.3Ω, V _{GS} =-4.5V	--	12	--	nS
t _r	Turn-on Rise Time		--	5.6	--	nS
t _{d(off)}	Turn-Off Delay Time		--	22	--	nS
t _f	Turn-Off Fall Time		--	9	--	nS
Source- Drain Diode Characteristics						
I _S	Max. Diode Forward Current		--	--	-3	A
V _{SD}	Forward on voltage	I _S =-2.2 A, V _{GS} =0V	--	--	-1.2	V

Notes: Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.



N And P-Channel Enhancement Mode Power MOSFET

N-Channel Typical Characteristics

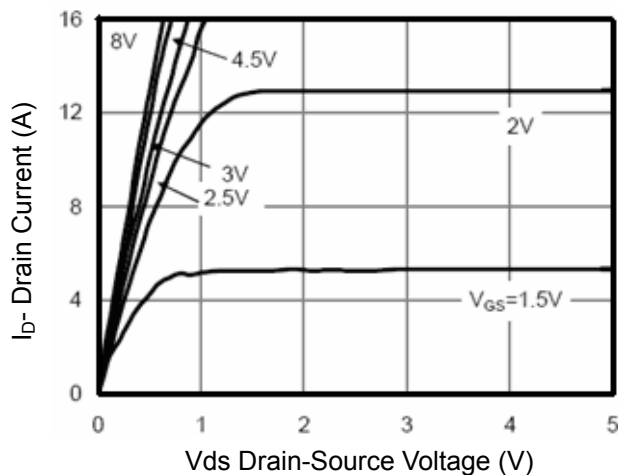


Figure 1 Output Characteristics

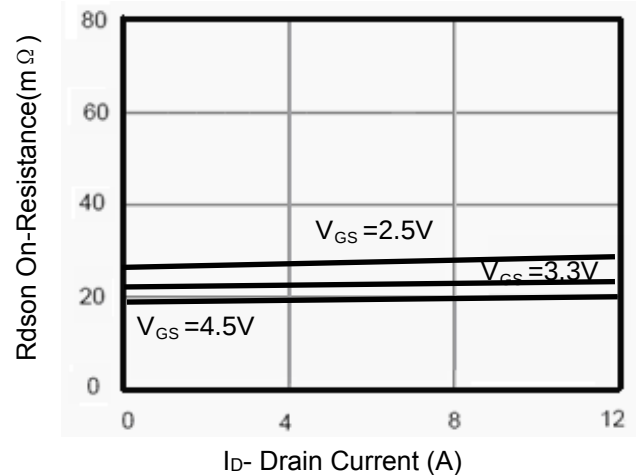


Figure 2 Drain-Source On-Resistance

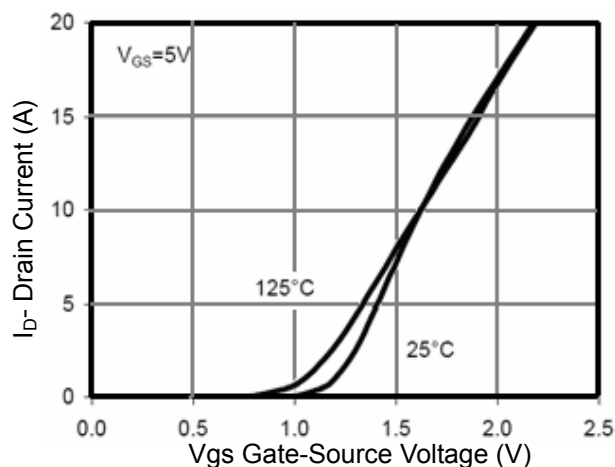


Figure 3 Transfer Characteristics

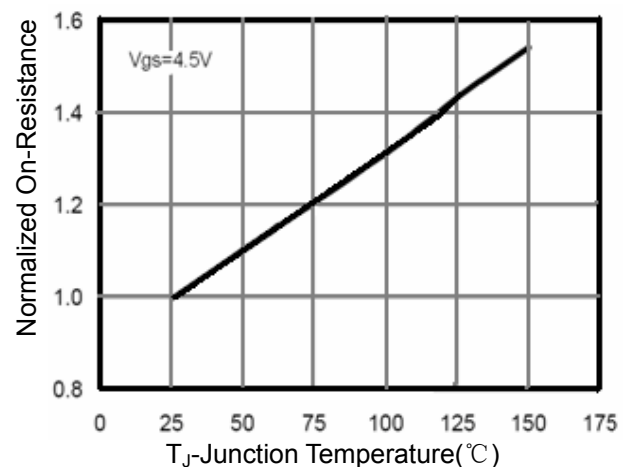


Figure 4 Drain-Source On-Resistance

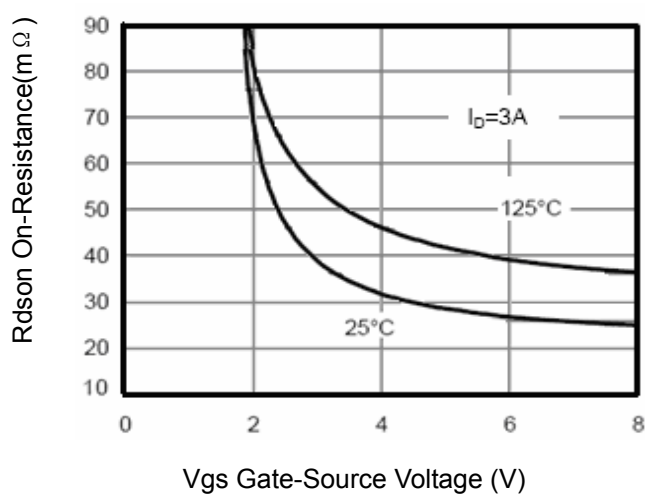


Figure 5 Rdson vs VGS

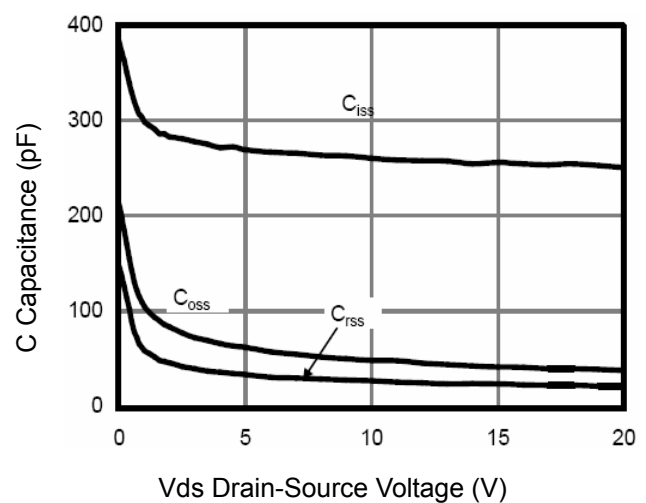
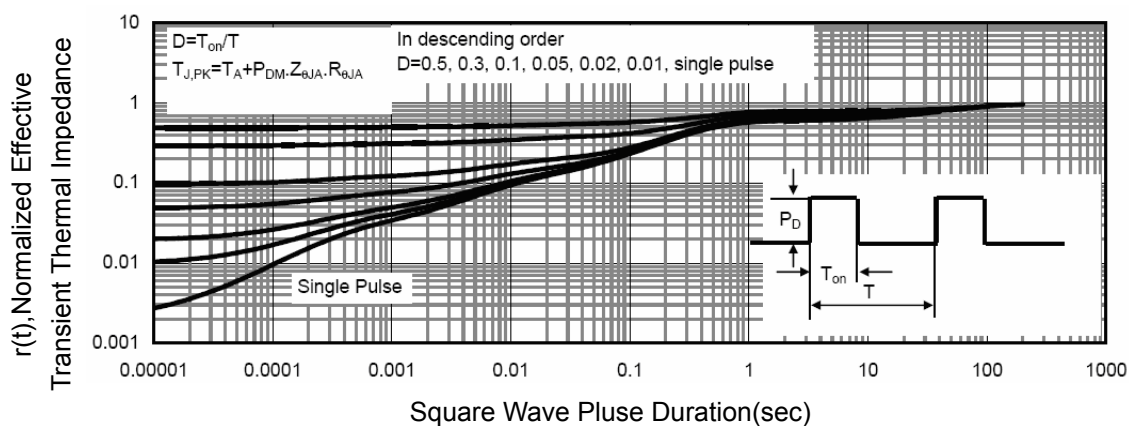
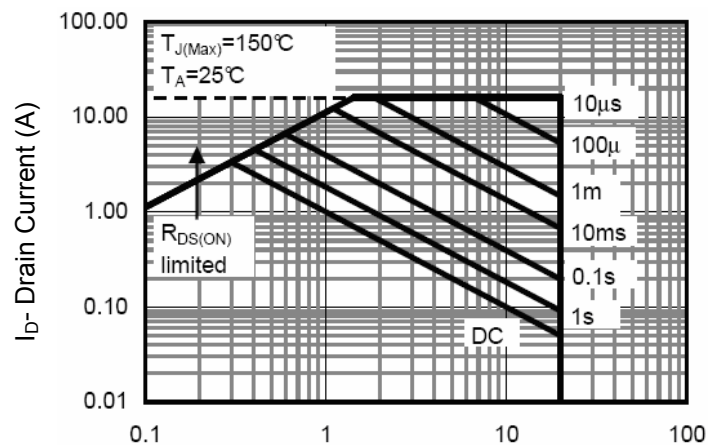
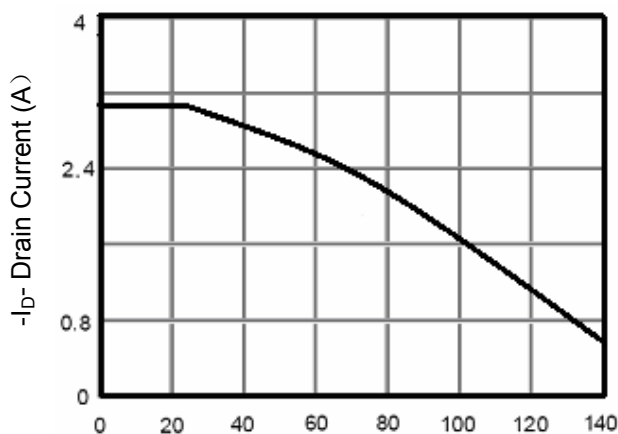
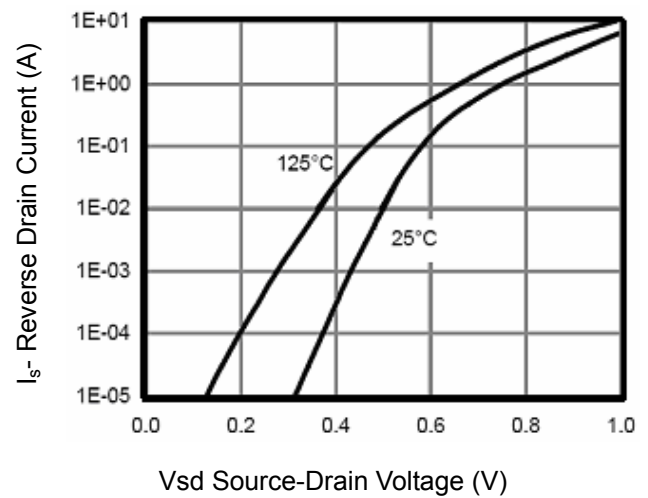
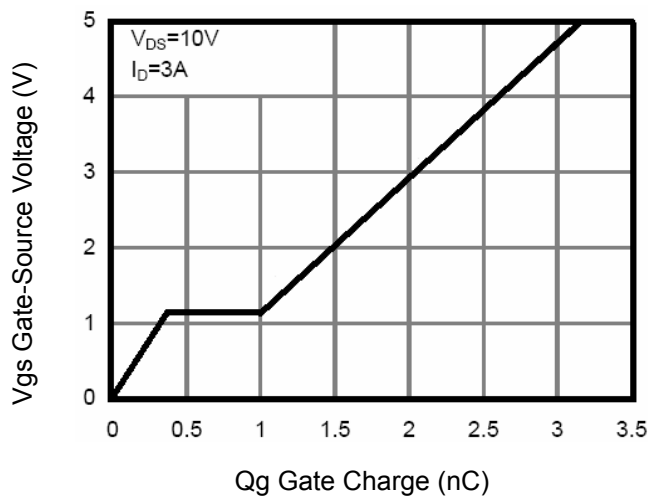


Figure 6 Capacitance vs Vds



N And P-Channel Enhancement Mode Power MOSFET

N-Channel Typical Characteristics





N And P-Channel Enhancement Mode Power MOSFET

P-Channel Typical Characteristics

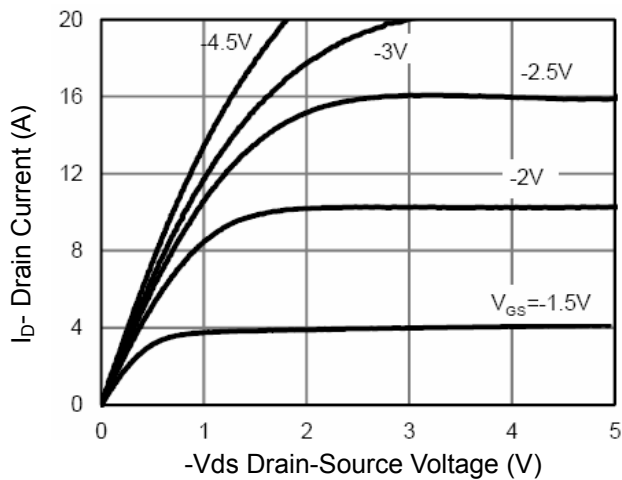


Figure 1 Output Characteristics

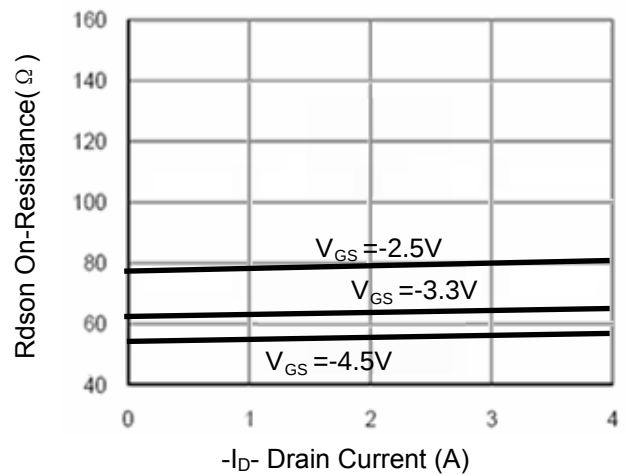


Figure 2 Drain-Source On-Resistance

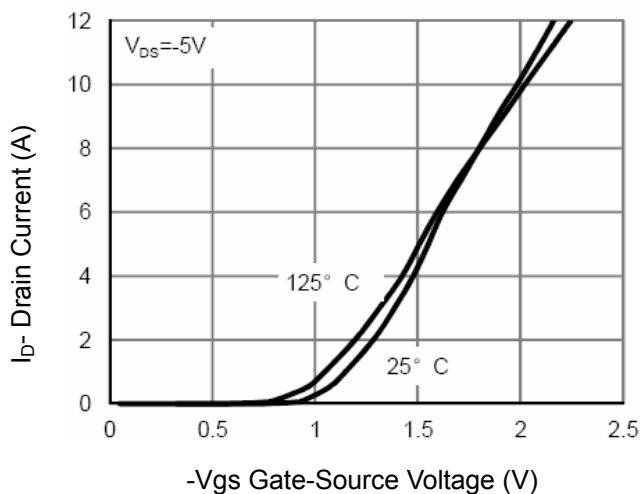


Figure 3 Transfer Characteristics

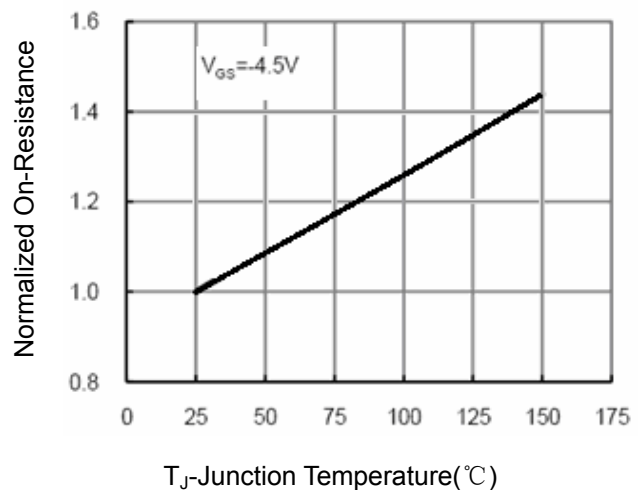
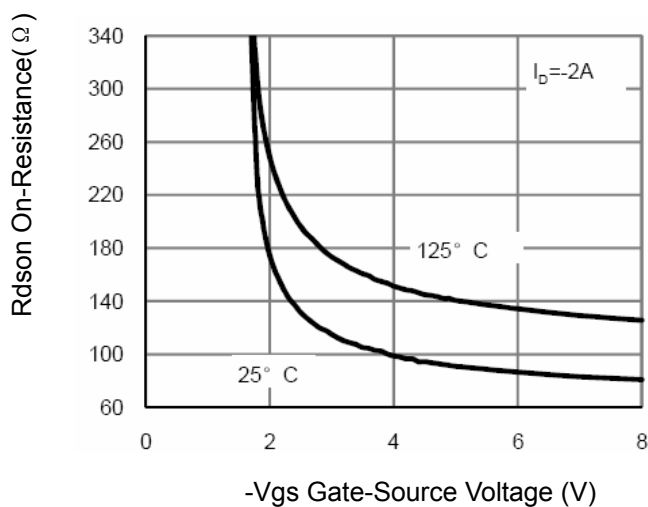
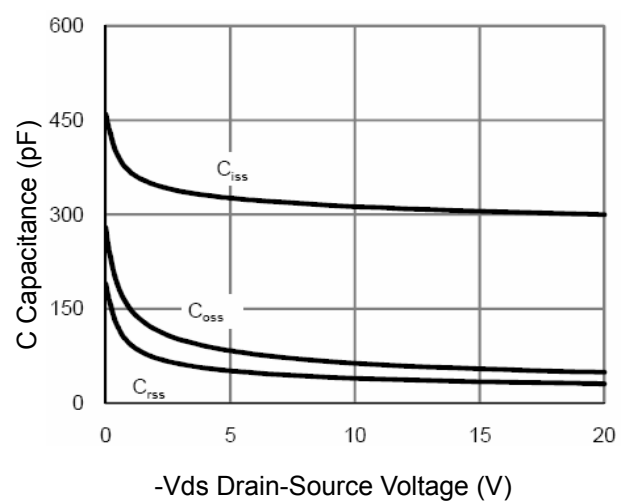


Figure 4 Drain-Source On-Resistance

Figure 5 $R_{DS(on)}$ vs V_{GS} Figure 6 Capacitance vs V_{DS}



N And P-Channel Enhancement Mode Power MOSFET

P-Channel Typical Characteristics

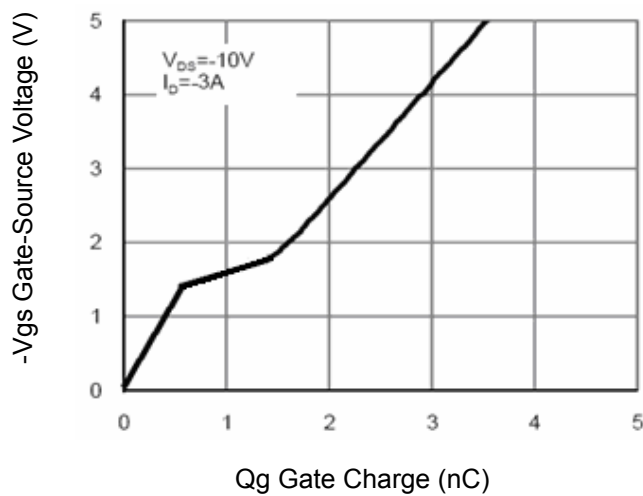


Figure 7 Gate Charge

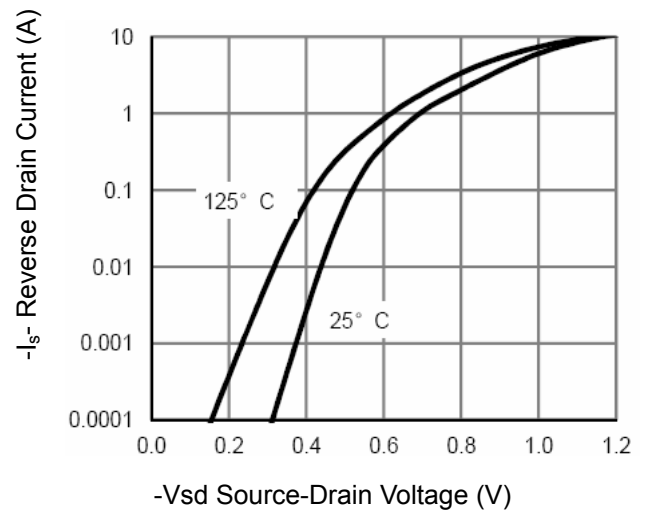


Figure 8 Source- Drain Diode Forward

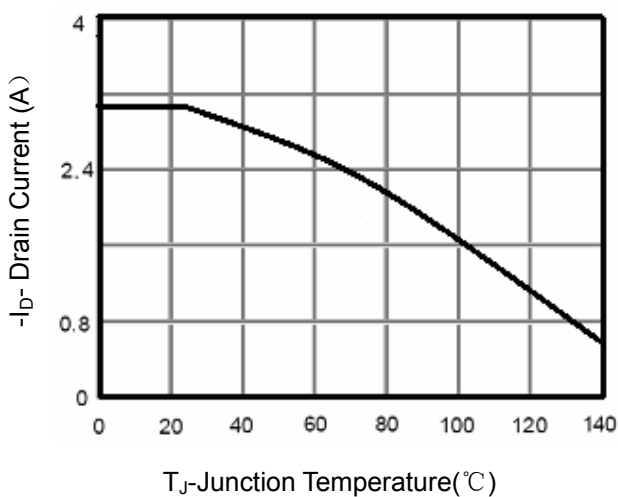


Figure 9 Drain Current

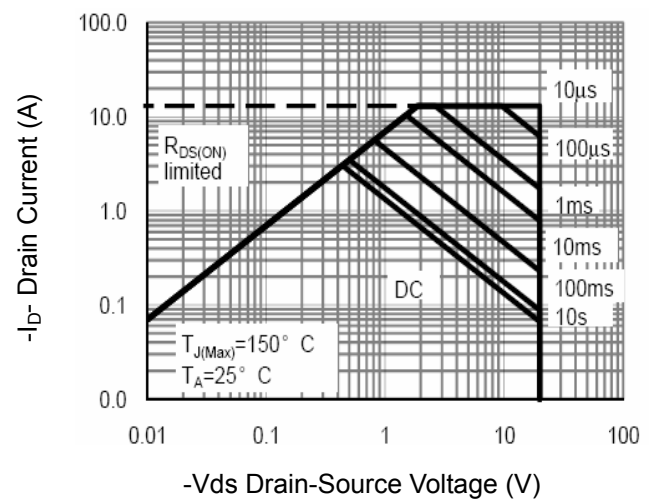


Figure 10 Safe Operation Area

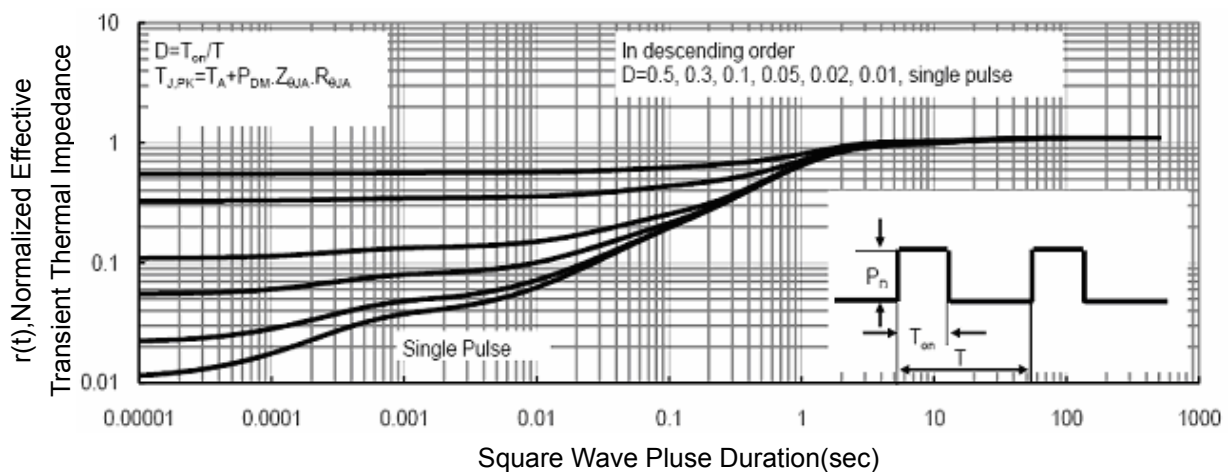
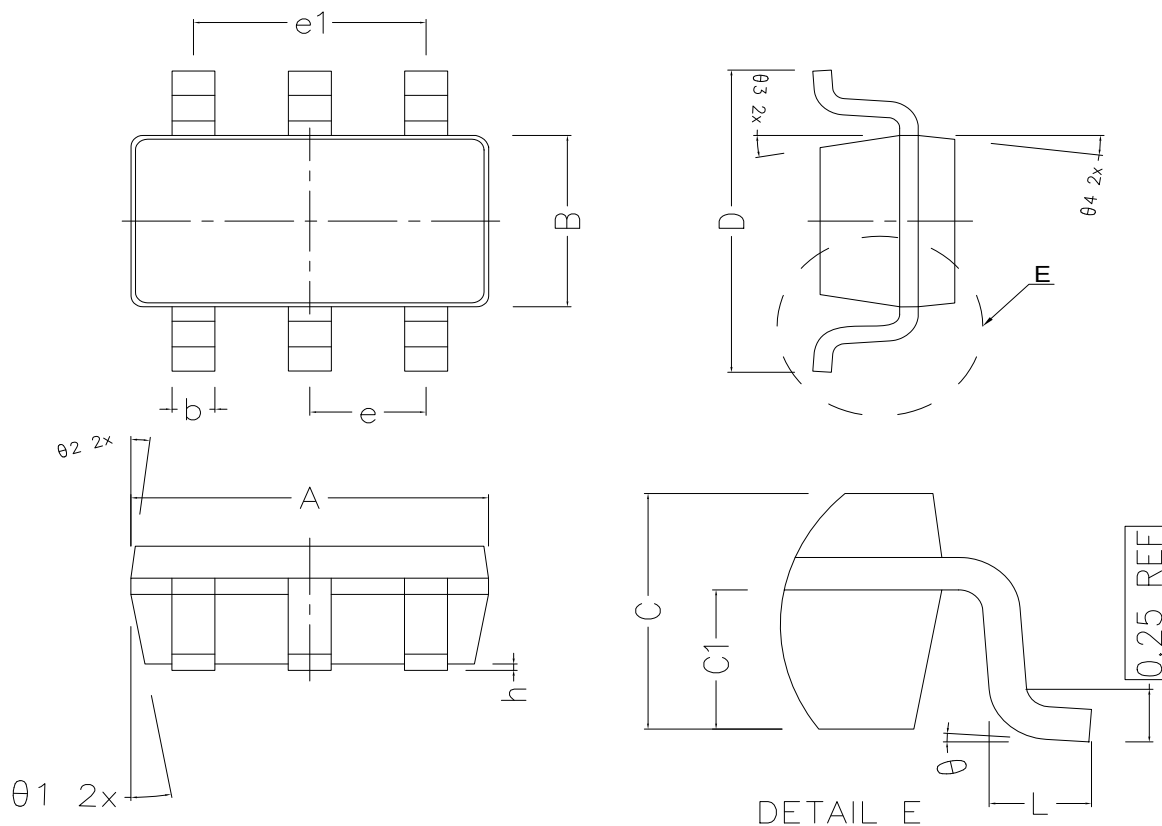


Figure 11 Normalized Maximum Transient Thermal Impedance



N And P-Channel Enhancement Mode Power MOSFET

SOT-23-6L Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.820	2.920	3.020
B	1.500	1.600	1.700
C	1.050	1.100	1.150
C1	0.600	0.650	0.700
D	2.650	2.800	2.950
L	0.300	0.450	0.600
b	0.280	0.350	0.420
h	0.020	0.050	0.100
K	0.120	—	0.230
e	0.950TYPE		
e1	1.900TYPE		
θ ₁	10° TYPE		
θ ₂	7° TYPE		
θ ₃	10° TYPE		
θ ₄	7° TYPE		
θ	0° ~ 8°		