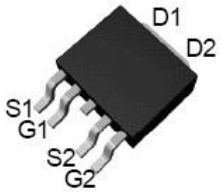
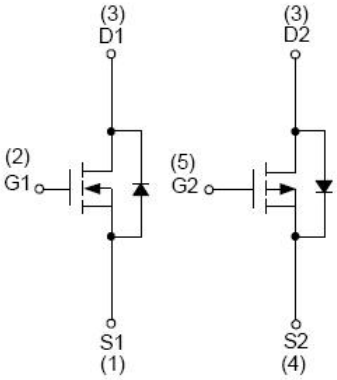
Features

- Low On resistance.
- 4.5V drive.
- RoHS compliant.

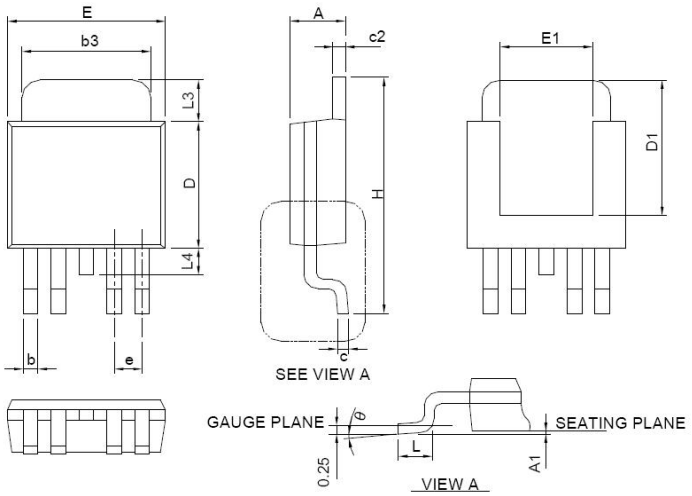




N-Channel MOSFET P-Channel MOSFET

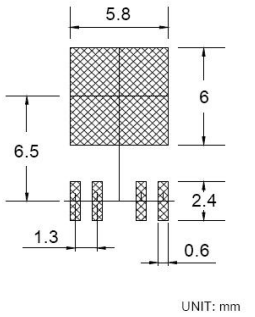
Package Dimensions

TO-252-4



SYMBOL	TO-252-4			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.2	-	0.008
b	0.50	0.71	0.020	0.028
b3	4.32	5.46	0.170	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	1.30 BSC		0.051 BSC	
H	9.40	10.41	0.370	0.410
L	1.40	1.78	0.055	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



Specifications

Absolute Maximum Ratings at T_a=25^{0}C

Parameter	Symbol	Conditions	N-Ch	P-Ch	Unit
Drain-to-Source Voltage	V_{DSS}		40	-40	V
Gate-to-Source Voltage	V_{GSS}		±20	±20	V
Drain Current (DC)	I_D		25	-18	A
Drain Current (Pulse)	I_{DP}	PW≤10uS, duty cycle≤1%	60	-48	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (1000mm^2×0.8mm) 1unit	50	50	W
Total Dissipation	P_T	Mounted on a ceramic board (1000mm^2×0.8mm)	2	5	W
Avalanche Energy	E_{AS}	T_J=25^{0}C, V_{DS}=20V, V_{GS}=10V	160	160	mJ
Channel Temperature	T_{ch}		150	150	^{0}C
Storage Temperature	T_{stg}		-55~+150	-55~+150	^{0}C

Electrical Characteristics (N-Channel) at T_a=25^{0}C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250uA, V_{GS}=0V	40	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V	-	-	1	uA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250uA	1	1.5	2.5	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	I_D=1A, V_{GS}=10V	-	7	12	mΩ
	$R_{DS(ON)}$	I_D=1A, V_{GS}=4.5V	-	15	18	mΩ
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	1200	-	pF
Output Capacitance	C_{oss}	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	250	-	pF
Reverse Transfer Capacitance	C_{rss}	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	110	-	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=15V, R_L=0.75Ω, R_{GEN}=1Ω, V_{GS}=10V	-	15	-	nS
Rise Time	t_r		-	16	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	36	-	nS
Fall Time	t_f		-	13	-	nS
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=10V, I_D=20A	-	26	-	nC
Gate-to-Source Charge	Q_{gs}		-	18	-	nC
Gate-to-Drain "Miller" Charge	Q_{gd}		-	28	-	nC
Diode Forward Voltage	V_{SD}	I_S=3A, V_{GS}=0V	-	0.75	-	V

Electrical Characteristics (P-Channel) at T_a=25^{0}C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=-250uA, V_{GS}=0V	-40	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=-40V, V_{GS}=0V	-	-	-1	uA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=-250uA	-1	-1.7	-3	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	I_D=-1A, V_{GS}=-10V	-	16	25	mΩ
	$R_{DS(ON)}$	I_D=-1A, V_{GS}=-4.5V	-	21	30	mΩ
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	1520	-	pF
Output Capacitance	C_{oss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	260	-	pF
Reverse Transfer Capacitance	C_{rss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	120	-	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=-15V, R_L=0.75Ω, R_{GEN}=1Ω, V_{GS}=10V	-	16	-	nS
Rise Time	t_r		-	18	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	49	-	nS
Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V, V_{GS}=10V, I_D=-10A	-	28	-	nC
Gate-to-Source Charge	Q_{gs}		-	21	-	nC
Gate-to-Drain "Miller" Charge	Q_{gd}		-	32	-	nC
Diode Forward Voltage	V_{SD}	I_S=-3A, V_{GS}=0V	-	-0.75	-	V

Typical Characteristics (N-Channel) at T_a=25^{0}C

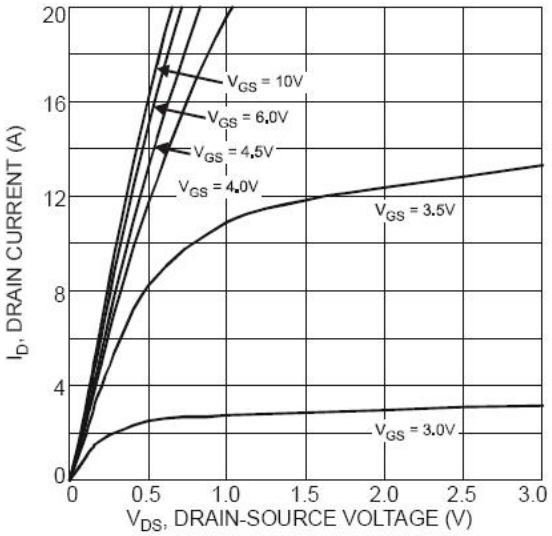


Fig. 1 Typical Output Characteristic

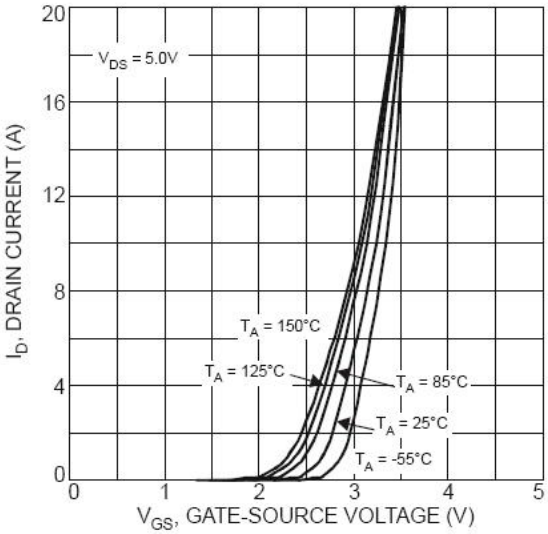


Fig. 2 Typical Transfer Characteristics

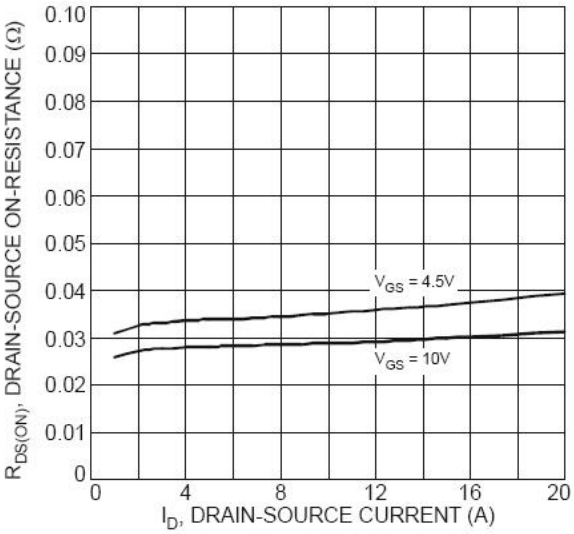


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

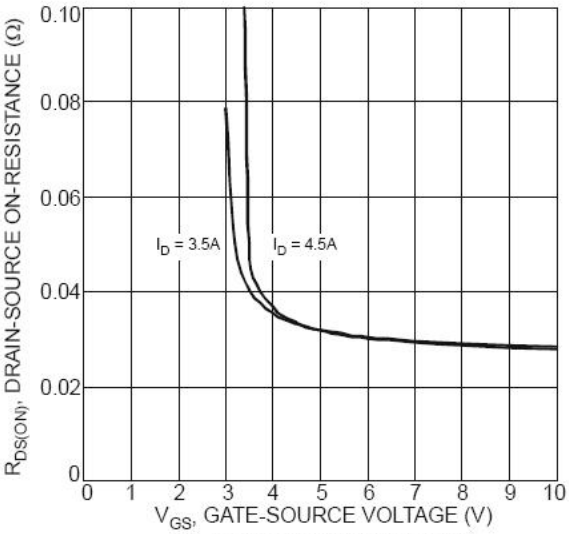


Fig. 4 Typical On-Resistance vs. Drain Current and Gate Voltage

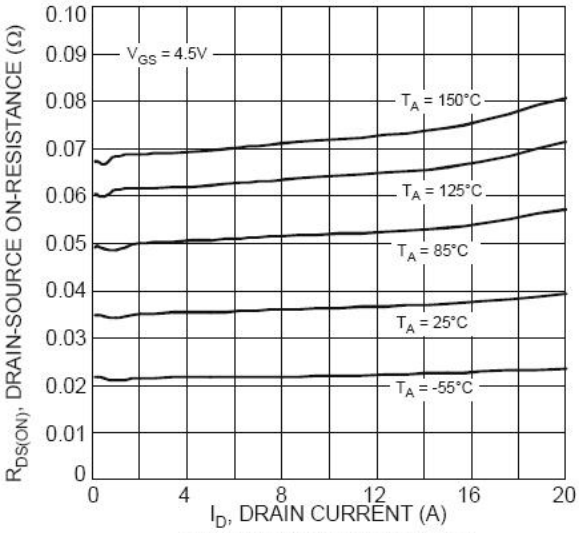


Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

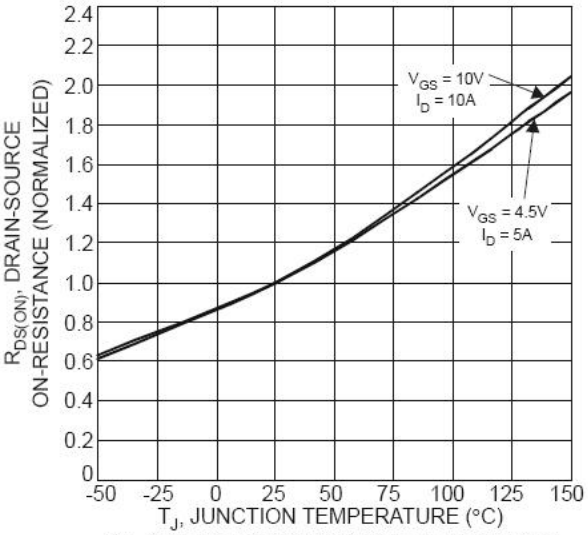


Fig. 6 On-Resistance Variation with Temperature

Typical Characteristics (N-Channel) at T_a=25^{0}C (Continued)

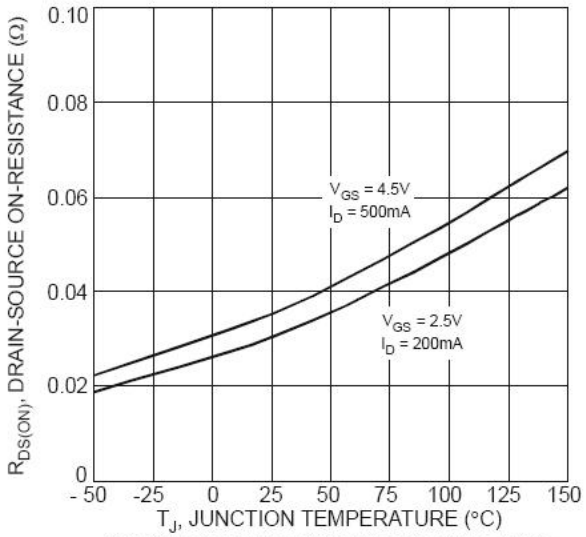


Fig. 7 On-Resistance Variation with Temperature

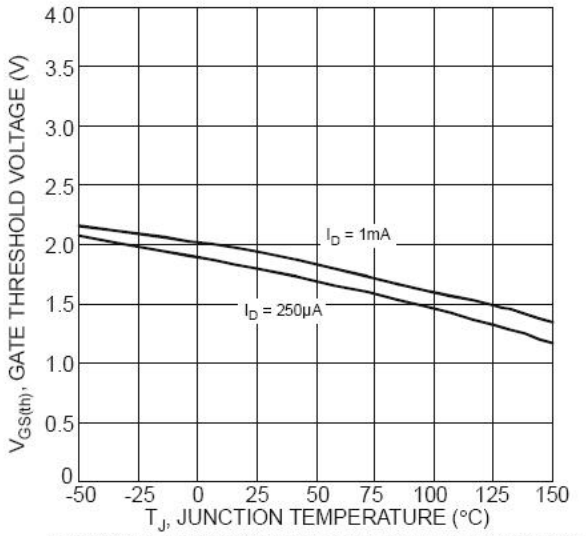


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

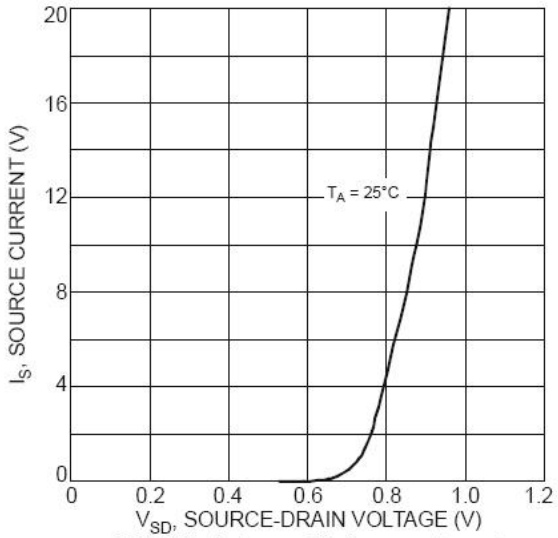


Fig. 9 Diode Forward Voltage vs. Current

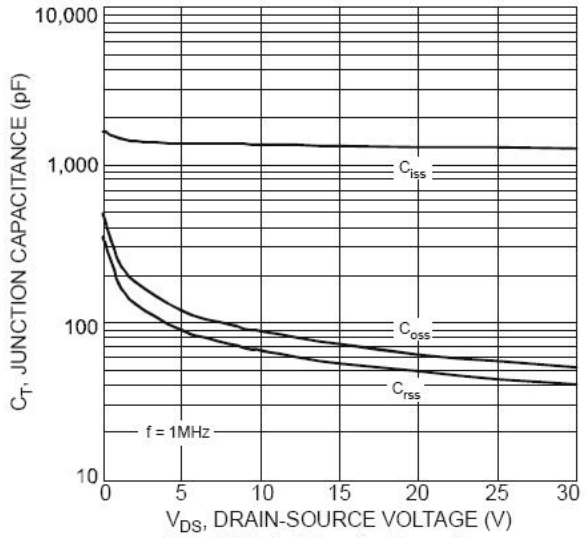


Fig. 10 Typical Junction Capacitance

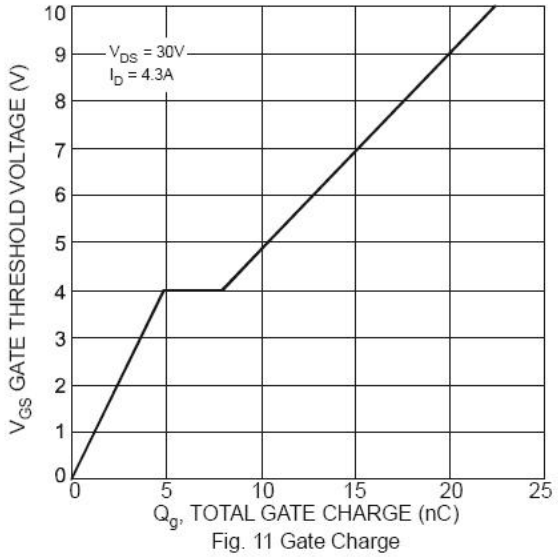


Fig. 11 Gate Charge

Typical Characteristics (P-Channel) at T_a=25^{0}C

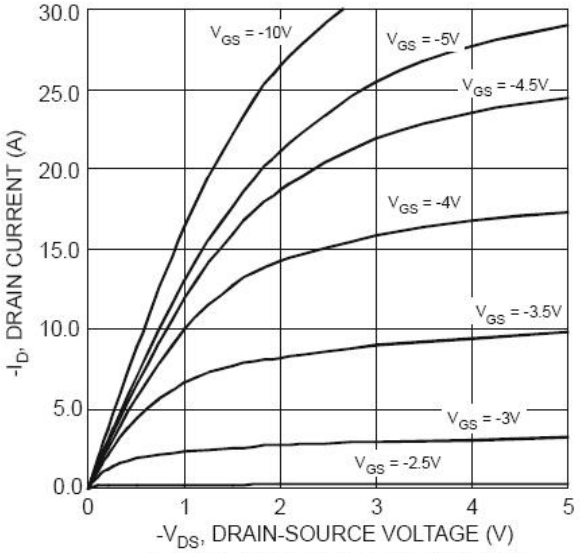


Figure 1 Typical Output Characteristics

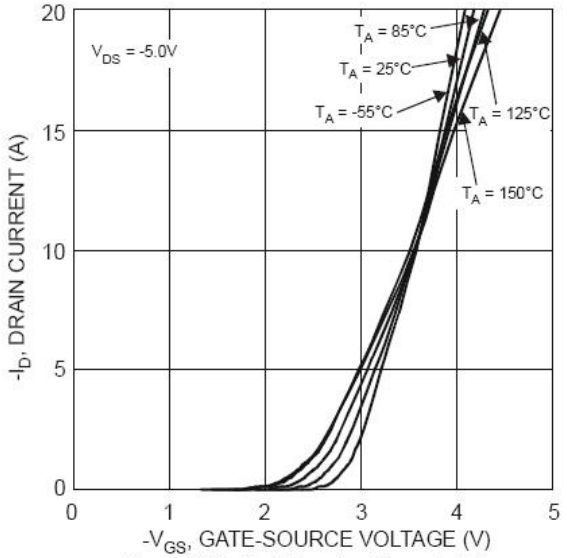


Figure 2 Typical Transfer Characteristics

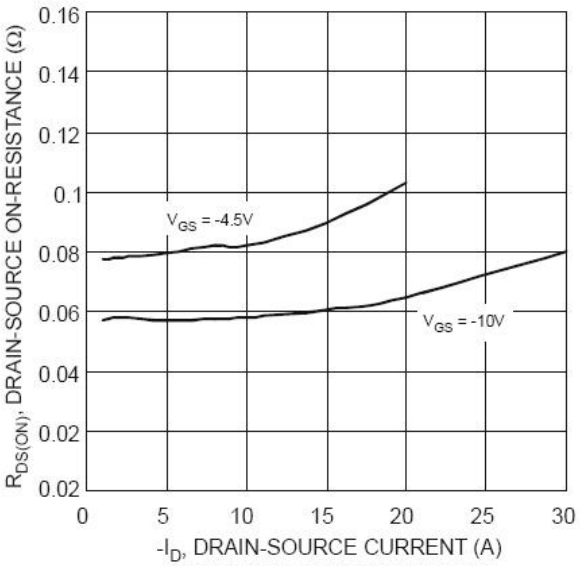


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

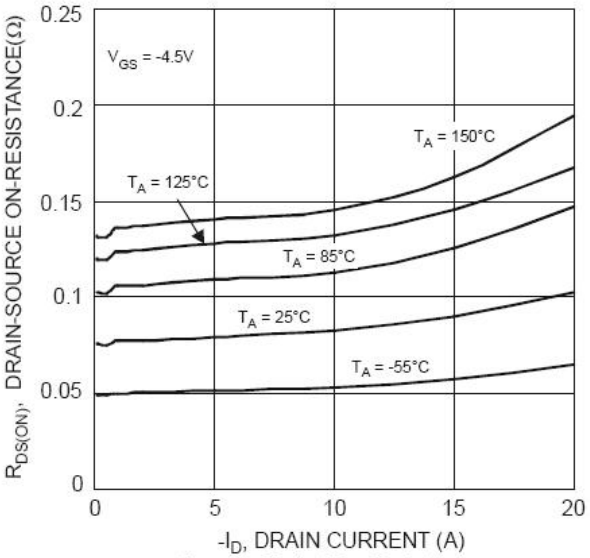


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

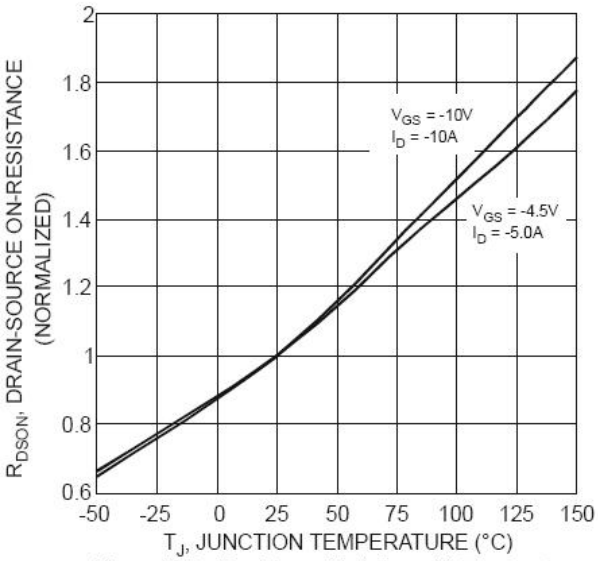


Figure 5 On-Resistance Variation with Temperature

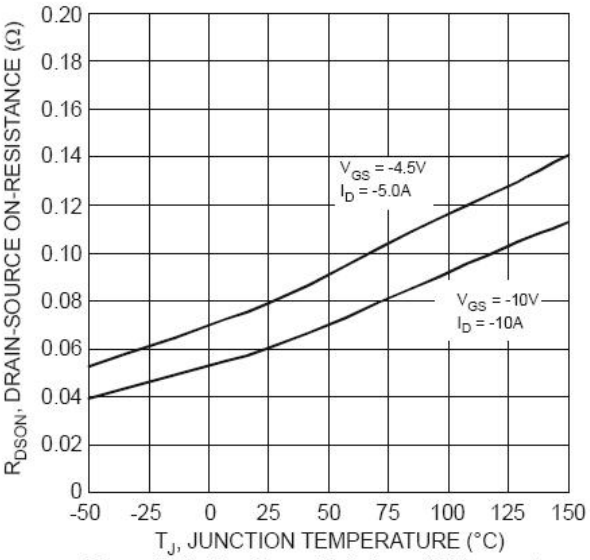


Figure 6 On-Resistance Variation with Temperature

Typical Characteristics (P-Channel) at T_a=25^{0}C (Continued)

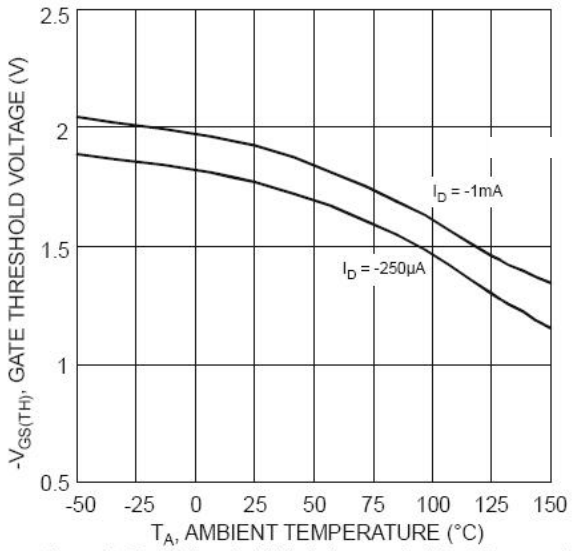


Figure 7 Gate Threshold Variation vs. Ambient Temperature

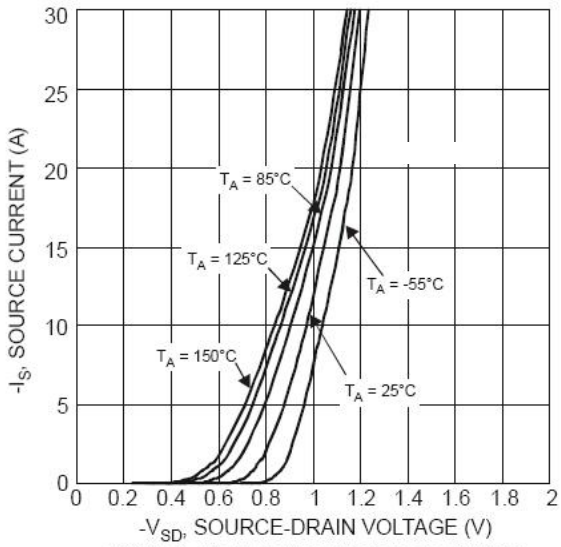


Figure 8 Diode Forward Voltage vs. Current

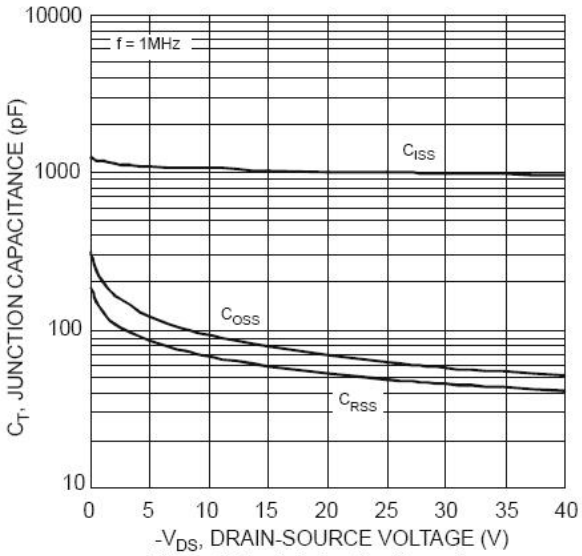


Figure 9 Typical Junction Capacitance

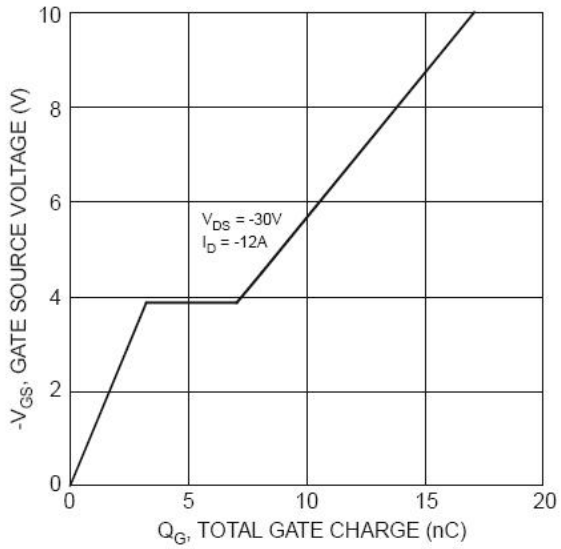


Figure 10 Gate Charge Characteristics