

General Description

The MY1004 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

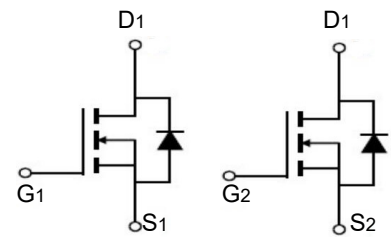
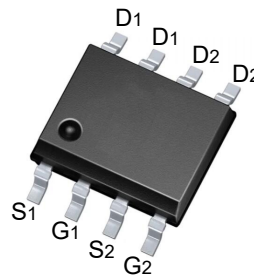


Features

V_{DSS}	40	-40	V
I_D	12	-10	A
$R_{DS(ON)}(at V_{GS}=10V)$	< 21		mΩ
$R_{DS(ON)}(at V_{GS}=-10V)$	<38		mΩ

Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY1004	SOP-8	MY1004	3000

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating		Units
		N Ch	P Ch	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
$I_D@T_A=25^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	12	-10	A
$I_D@T_A=70^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	10	-8	A
I_{DM}	Pulsed Drain Current ²	36	-22	A
EAS	Single Pulse Avalanche Energy ³	25	25	mJ
I_{AS}	Avalanche Current	10	10	A
$P_D@T_A=25^{\circ}\text{C}$	Total Power Dissipation ⁴	2	2	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62.5	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	50	$^{\circ}\text{C/W}$

N-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	N Channel			Unit
			Min.	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250mA$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=32V, V_{GS}=0V$	-	-	1	mA
		$T_J=85^\circ\text{C}$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250mA$	1.5	2	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(ON) c}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=6A$	-	16	21	m Ω
		$V_{GS}=4.5V, I_{DS}=5A$	-	18	25	
$V_{SD c}$	Diode Forward Voltage	$I_{SD}=1A, V_{GS}=0V$	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	$I_{DS}=6A, dI_{SD}/dt=100A/ms$	-	13	-	ns
Q_{rr}	Reverse Recovery Charge		-	8.7	-	nC
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	2.5	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz	-	815	-	pF
C_{oss}	Output Capacitance		-	95	-	
C_{rss}	Reverse Transfer Capacitance		-	60	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, R_L=20W,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6W$	-	7.8	-	ns
t_r	Turn-on Rise Time		-	6.9	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	22.4	-	
t_f	Turn-off Fall Time		-	4.8	-	
Q_g	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V, I_{DS}=6A$	-	15.7	22	nC
Q_g	Total Gate Charge	$V_{DS}=20V, V_{GS}=4.5V,$ $I_{DS}=6A$	-	7.5	10.5	
Q_{gth}	Threshold Gate Charge		-	1.85	-	
Q_{gs}	Gate-Source Charge		-	3.24	-	
Q_{gd}	Gate-Drain Charge		-	2.75	-	

Note c: Pulse test ; pulse width $\leq 300ms$, duty cycle $\leq 2\%$.

Note d: Guaranteed by design, not subject to production testing.

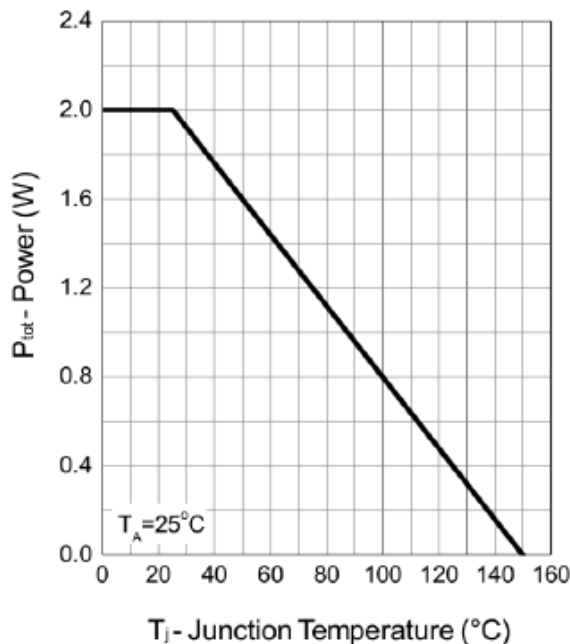
P-Channel Typical Characteristics

Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250mA	-40	-	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =-32V, V _{GS} =0V	-	-	-1	mA
		T _J =85°C	-	-	-30	mA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250mA	-1.5	-2	-2.5	V
IGSS	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} c	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-5.5A	-	30	38	mΩ
		V _{GS} =-4.5V, I _{DS} =-3.5A	-	46	62	
VSD c	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1	V
t _{rr}	Reverse Recovery Time	I _{DS} =-5.5A, dI _{SD} /dt=100A/ms	-	15	-	ns
Q _{rr}	Reverse Recovery Charge		-	8	-	nC
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	8	-	W
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	-	668	-	pF
C _{oss}	Output Capacitance		-	98	-	
C _{rss}	Reverse Transfer Capacitance		-	72	-	
td(ON)	Turn-on Delay Time	V _{DD} =-20V, R _L =20W, I _{DS} =-1A, V _{GEN} =-10V, R _G =6W	-	8.7	-	ns
t _r	Turn-on Rise Time		-	7	-	
td(OFF)	Turn-off Delay Time		-	31	-	
t _f	Turn-off Fall Time		-	17	-	
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-5.5A	-	15	-	nC
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-4.5V, I _{DS} =-5.5A	-	7.5	-	
Q _{gth}	Threshold Gate Charge		-	1.4	-	
Q _{gs}	Gate-Source Charge		-	2.4	-	
Q _{gd}	Gate-Drain Charge		-	3.5	-	

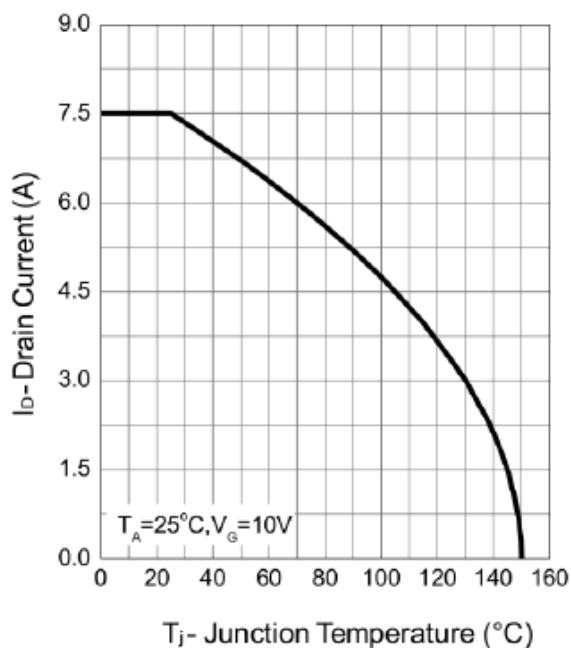
Note c: Pulse test; pulse width≤300ms, duty cycle≤2%.

Note d: Guaranteed by design, not subject to production testing.

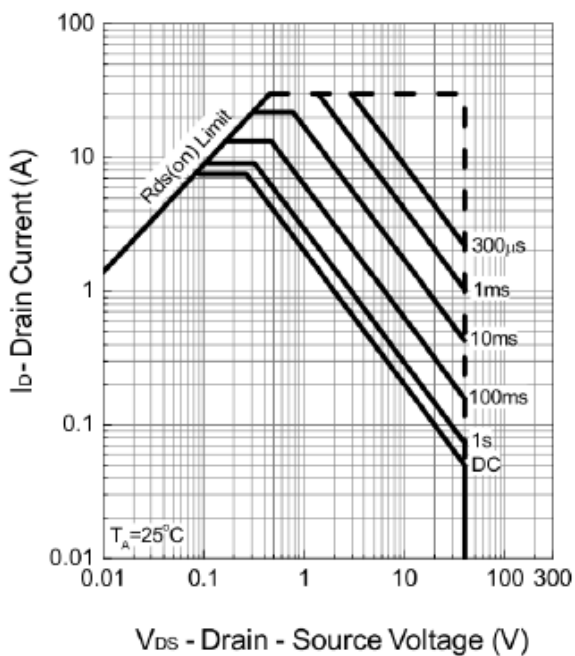
Power Dissipation



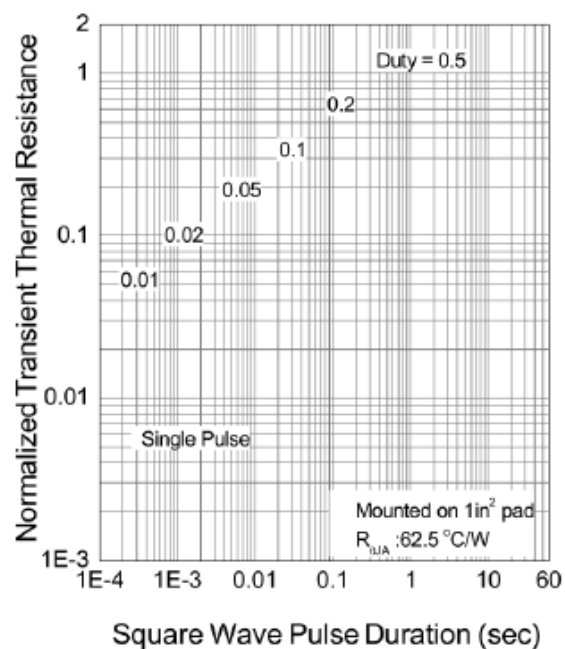
Drain Current



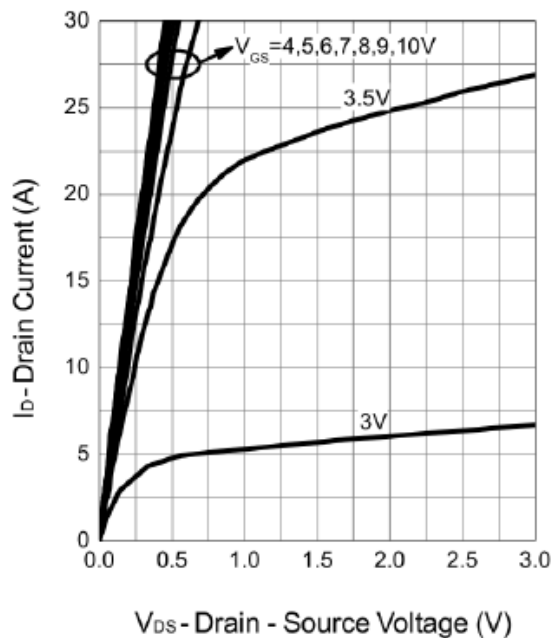
Safe Operation Area



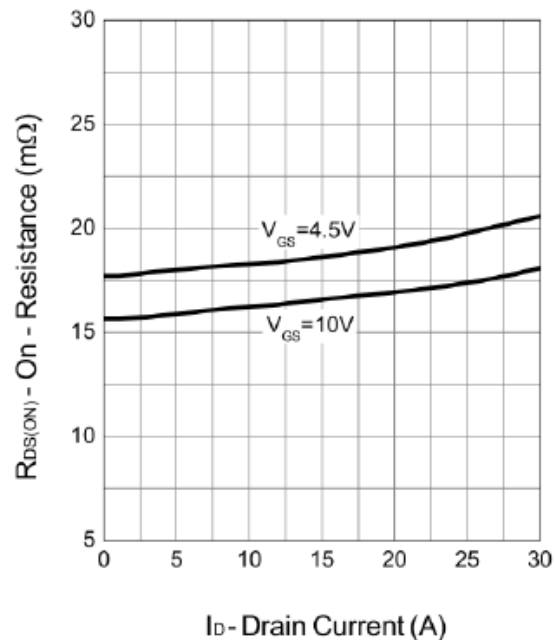
Thermal Transient Impedance



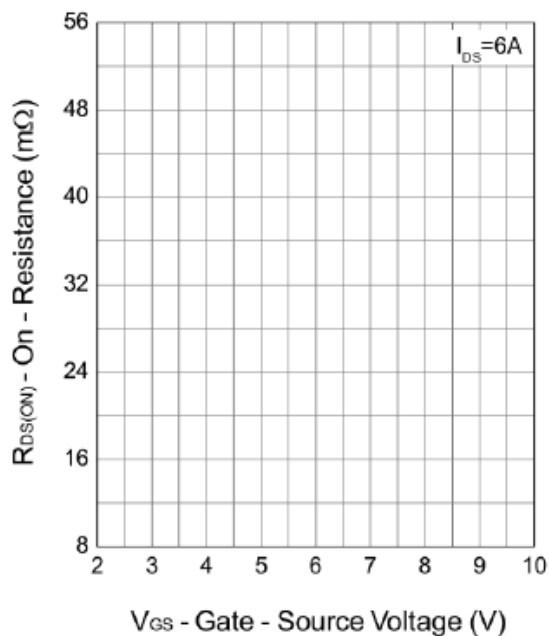
Output Characteristics



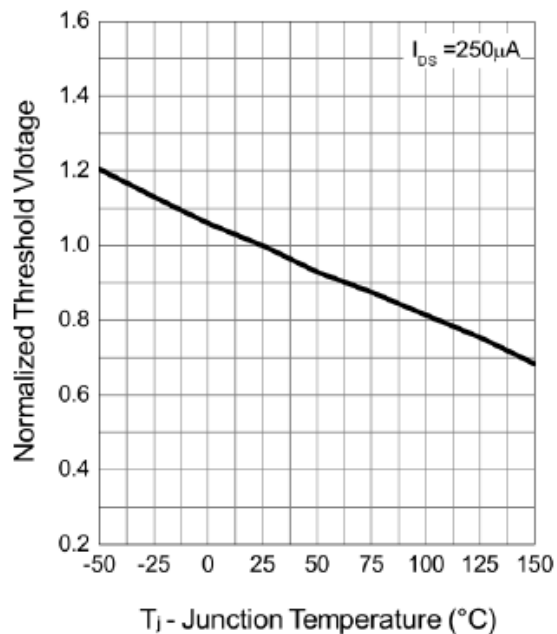
Drain-Source On Resistance

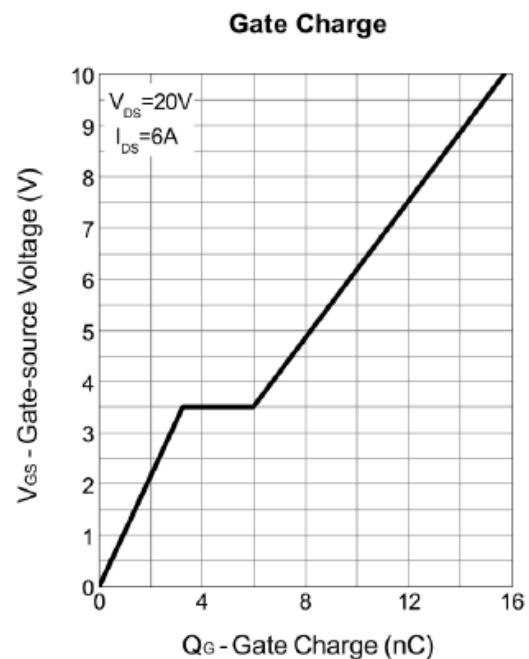
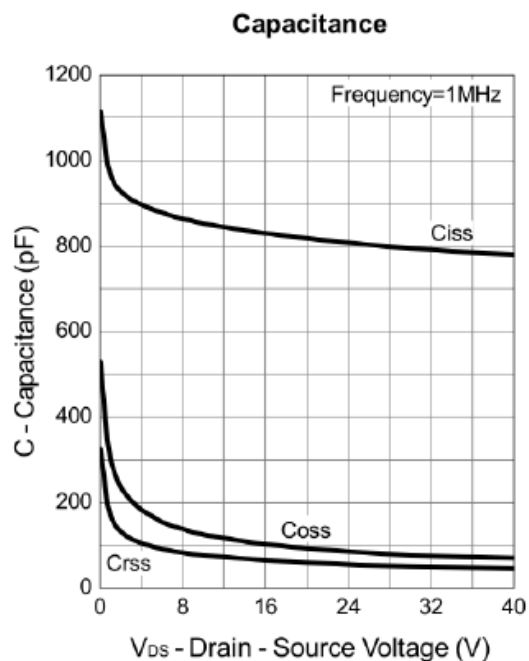
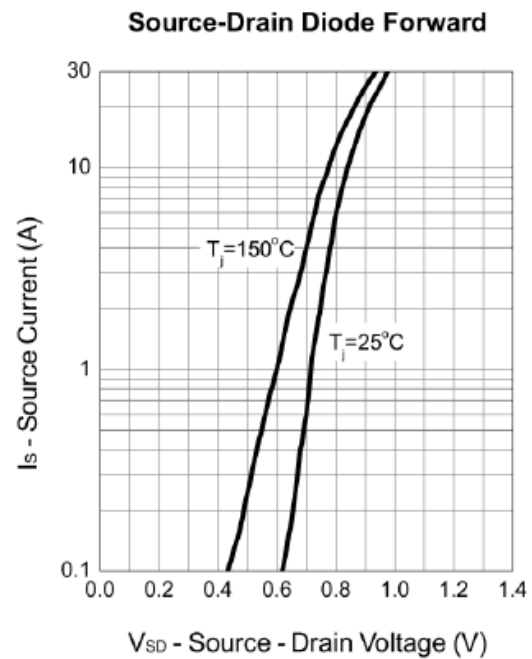
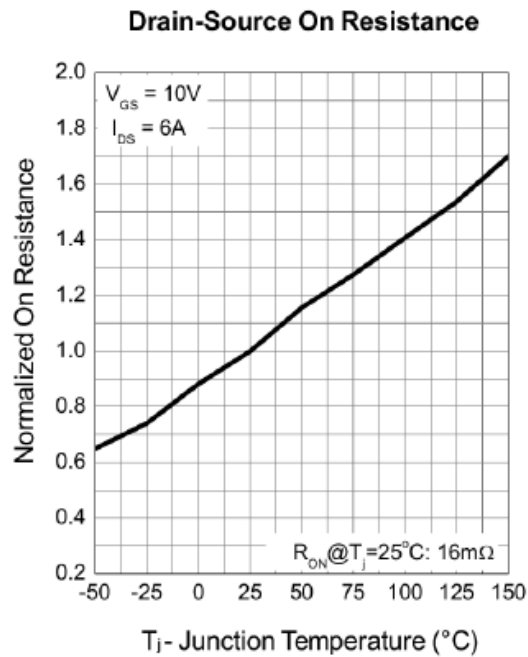


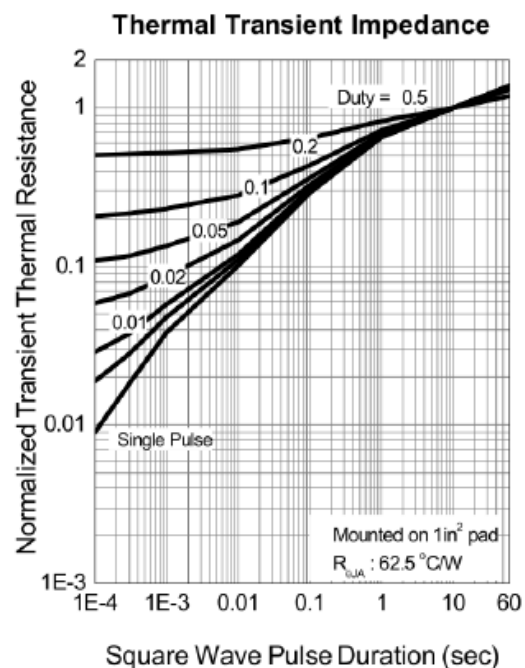
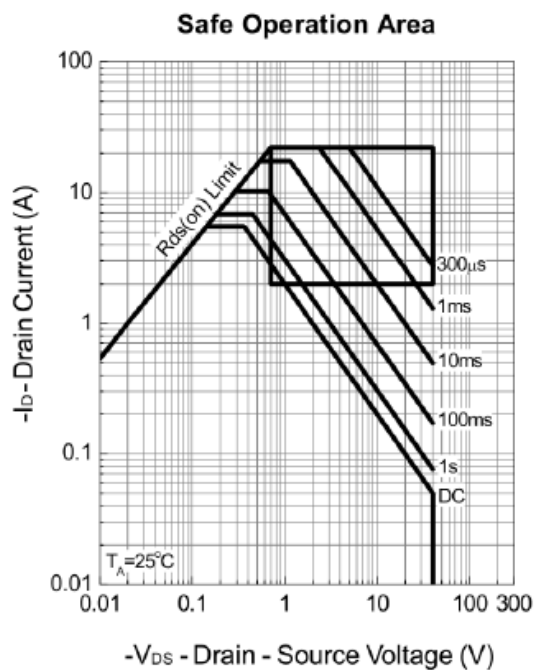
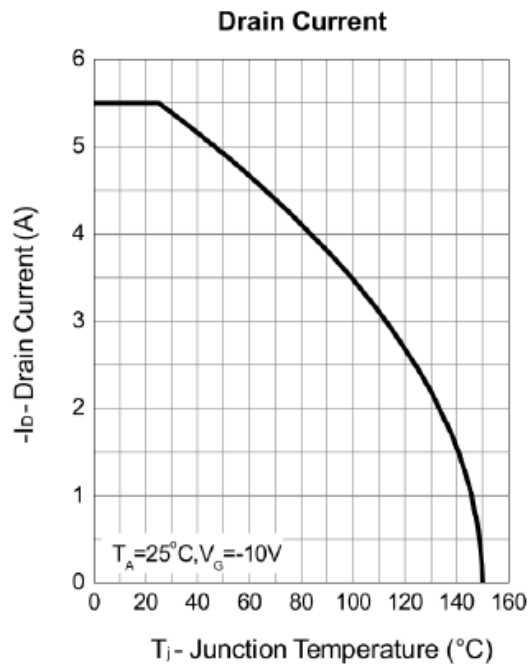
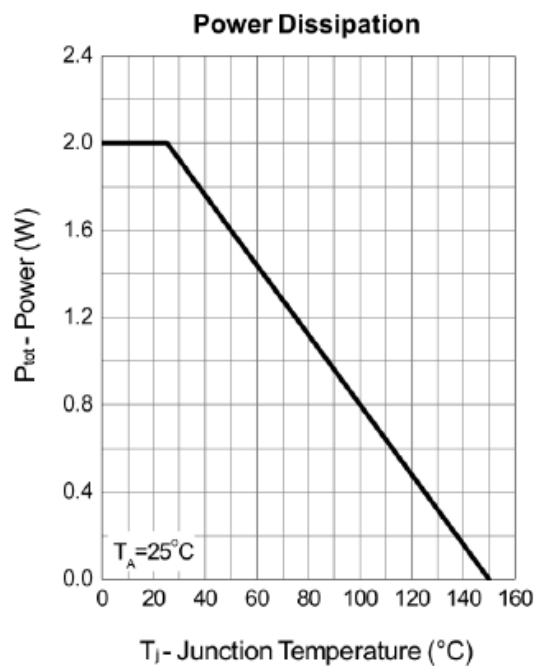
Gate-Source On Resistance



Gate Threshold Voltage







Package Mechanical Data-SOP-8

