

N- and P-Channel 40-V (D-S) MOSFET

GENERAL DESCRIPTION

The ME4565 is the N- and P-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching, and low in-line power loss are needed in a very small outline surface mount package.

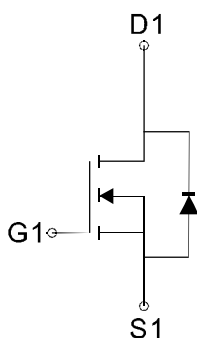
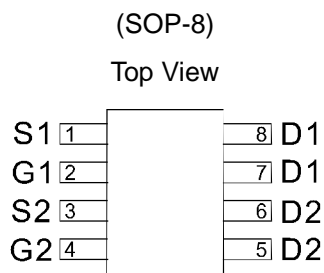
FEATURES

- $R_{DS(ON)} \leq 40m\Omega @ V_{GS}=10V$ (N-Ch)
- $R_{DS(ON)} \leq 45m\Omega @ V_{GS}=4.5V$ (N-Ch)
- $R_{DS(ON)} \leq 54m\Omega @ V_{GS}=-10V$ (P-Ch)
- $R_{DS(ON)} \leq 60m\Omega @ V_{GS}=-4.5V$ (P-Ch)
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

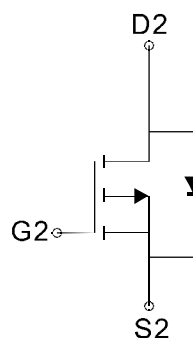
APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- LCD Display inverter

PIN CONFIGURATION



N-Channel MOSFET



P-Channel MOSFET

Absolute Maximum Ratings (TA=25°C Unless Otherwise Noted)

Parameter	Symbol	N-Channel		P-Channel		Unit	
		10 secs	Steady State	10 secs	Steady State		
Drain-Source Voltage	V_{DSS}	40		-40		V	
Gate-Source Voltage	V_{GSS}	± 16		± 16			
Continuous Drain Current (Tj=150°C)	I_D	$T_A=25^\circ C$	5.2	3.9	-4.5	-3.3	A
		$T_A=70^\circ C$	4.2	3.1	-3.6	-2.7	
Pulsed Drain Current	I_{DM}	30		20			
Avalanche Current	I_{AS}	13		16		mJ	
Single Pulse Avalanche Energy	E_{AS}	8.5		13			
Maximum Power Dissipation	P_D	$T_A=25^\circ C$	2.5	1.56	2.45	1.52	W
		$T_A=70^\circ C$	2.0	1.3	2.0	1.27	
Operating Junction Temperature	T_J	-55 to 150				°C	
Thermal Resistance-Junction to Ambient *	$R_{\theta JA}$	50	80	51	82	°C/W	
Thermal Resistance-Junction to Case	$R_{\theta JC}$	49		50		°C/W	

*The device mounted on 1in² FR4 board with 2 oz copper

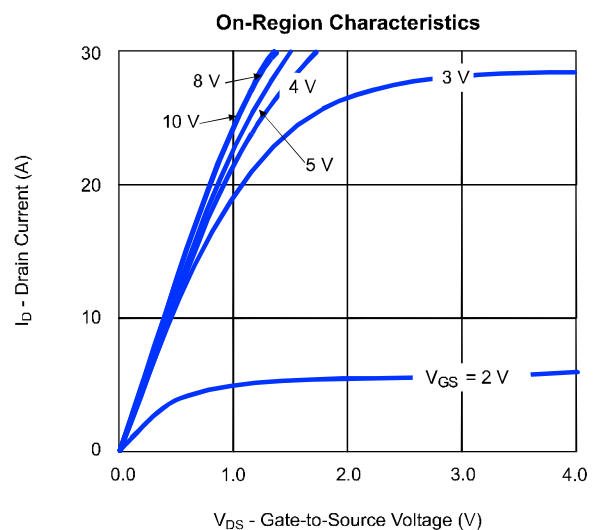
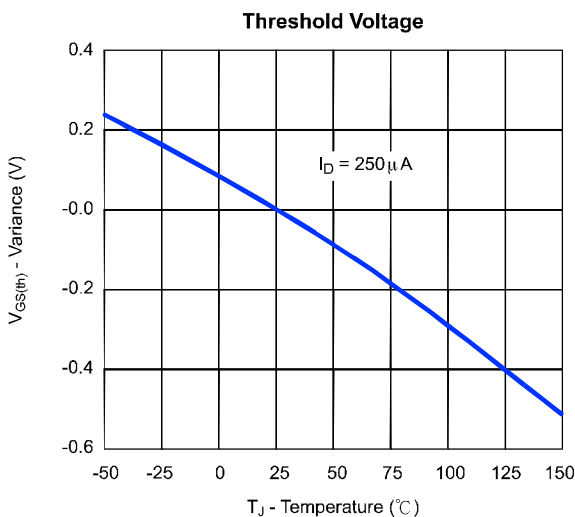
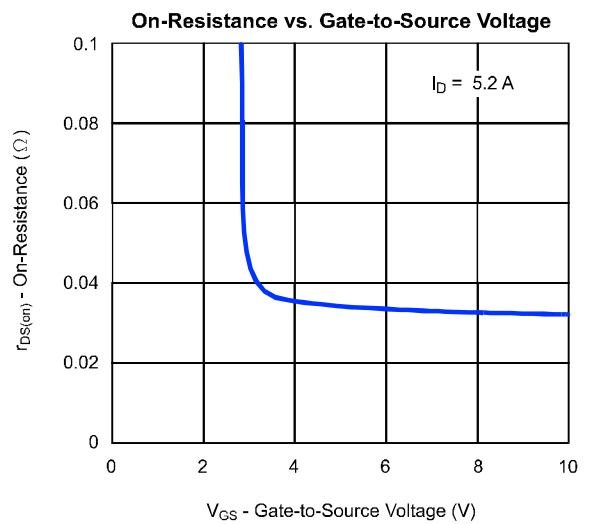
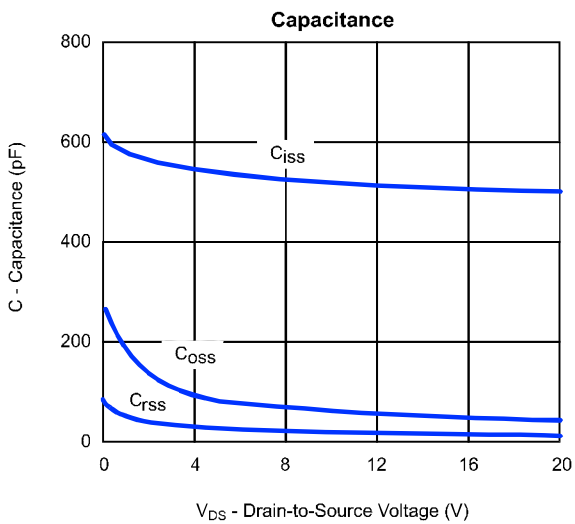
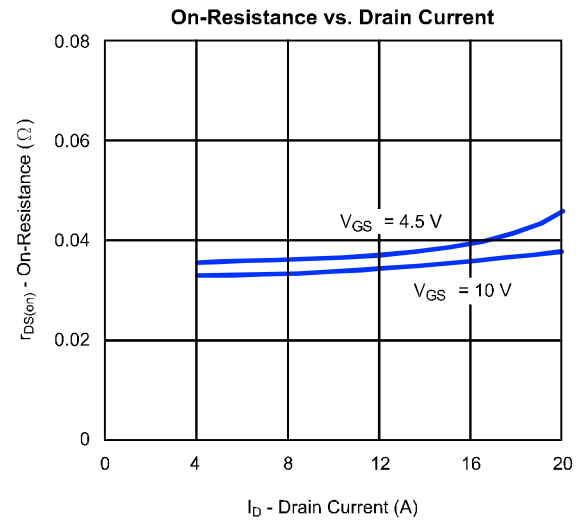
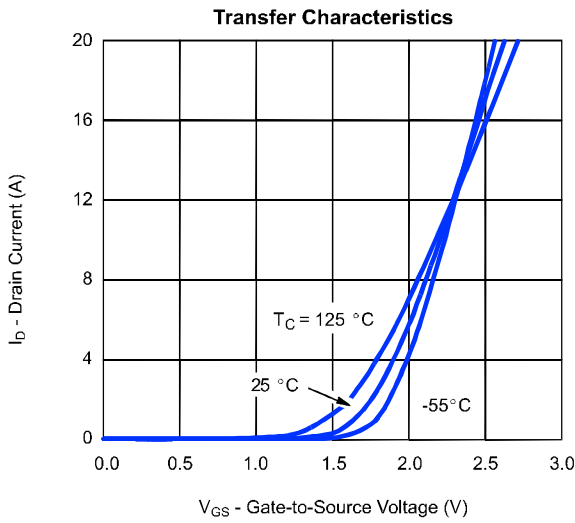
N- and P-Channel 40-V (D-S) MOSFET

Electrical Characteristics (T_A=25°C Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit	
STATIC							
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μA V _{GS} =0V, I _D =250 μA	N-Ch P-Ch	40 -40		V	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μA V _{DS} =V _{GS} , I _D =-250 μA	N-Ch P-Ch	0.6 -0.8	0.9 -1.0	1.6 -1.8	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±16V V _{DS} =0V, V _{GS} =±16V	N-Ch P-Ch			±100 ±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V V _{DS} =-40V, V _{GS} =0V	N-Ch P-Ch			1 -1	μA
		V _{DS} =40V, V _{GS} =0V, T _J =55°C V _{DS} =-40V, V _{GS} =0V, T _J =55°C	N-Ch P-Ch			10 -10	
I _{D(ON)}	On-State Drain Current	V _{DS} ≥ 5V, V _{GS} = 10V V _{DS} ≤ -5V, V _{GS} = -10V	N-Ch P-Ch	20 -20			A
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D = 5.2A V _{GS} =-10V, I _D = -4.5A	N-Ch P-Ch		32 43	40 54	mΩ
		V _{GS} =4.5V, I _D = 4.9A V _{GS} =-4.5V, I _D = -3.9A	N-Ch P-Ch		35 48	45 60	
G _{FS}	Forward Transconductance	V _{DS} =15V, I _D =5.2A V _{DS} =-15V, I _D =-4.5A	N-Ch P-Ch		18 13		S
V _{SD}	Diode Forward Voltage	I _S =1.7A, V _{GS} =0V I _S =-1.7A, V _{GS} =0V	N-Ch P-Ch		0.78 -0.79	1.2 -1.2	V
DYNAMIC							
Q _g	Total Gate Charge	N-Channel V _{DS} =20V, V _{GS} =4.5V, I _D =5.2A P-Channel V _{DS} =-20V, V _{GS} =-4.5V, I _D =-4.5A	N-Ch P-Ch		8 12	10 14	nC
Q _{gs}	Gate-Source Charge		N-Ch P-Ch		3.3 5		
Q _{gd}	Gate-Drain Charge		N-Ch P-Ch		2.8 5.2		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz V _{GS} =0V, V _{DS} =0V, f=1MHz	N-Ch P-Ch		0.7 4.5		Ω
C _{iss}	Input capacitance	N-Channel V _{DS} =20V, V _{GS} =0V, F=1MHz P-Channel V _{DS} =-20V, V _{GS} =0V, F=1MHz	N-Ch P-Ch		500 1000	600 1100	pF
C _{oss}	Output Capacitance		N-Ch P-Ch		43 81		
C _{rss}	Reverse Transfer Capacitance		N-Ch P-Ch		9.3 22		
t _{d(on)}	Turn-On Delay Time	N-Channel V _{DD} =15V, R _L =15Ω I _D =1A, V _{GEN} =10V, R _G =6Ω P-Channel V _{DD} =-15V, R _L =15Ω I _D =-1A, V _{GEN} =-10V, R _G =6Ω	N-Ch P-Ch		8 30	11 38	ns
t _r	Turn-On Rise Time		N-Ch P-Ch		15 12	20 18	
t _{d(off)}	Turn-Off Delay Time		N-Ch P-Ch		36 62	45 70	
t _f	Turn-On Fall Time		N-Ch P-Ch		2 5	5 8	

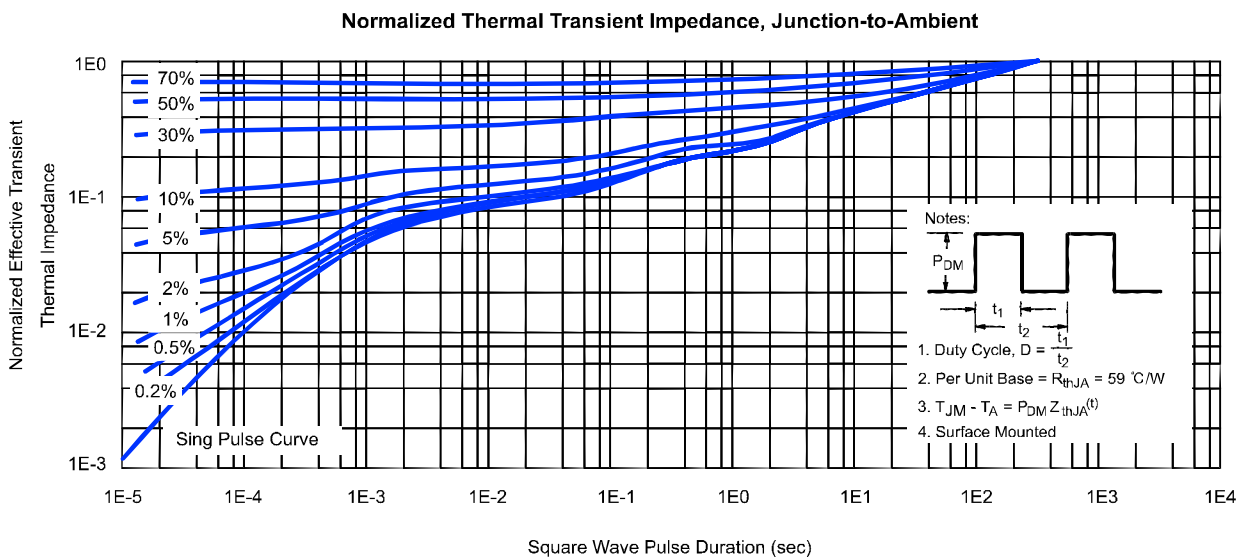
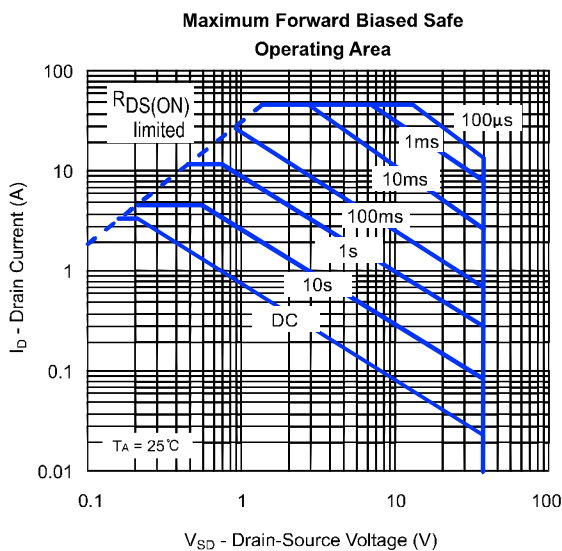
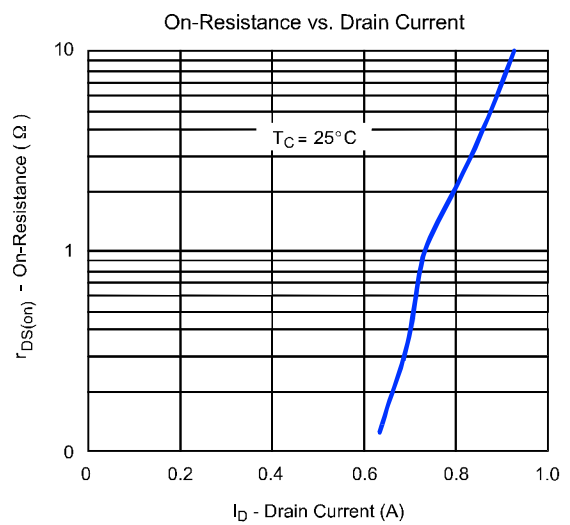
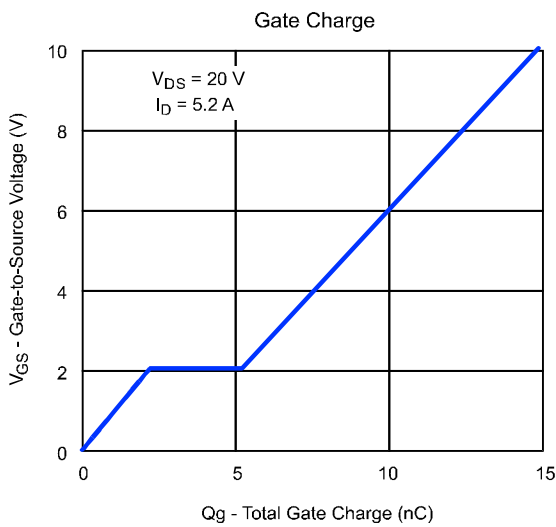
Typical Characteristics (T_J = 25°C Noted)

N-CHANNEL



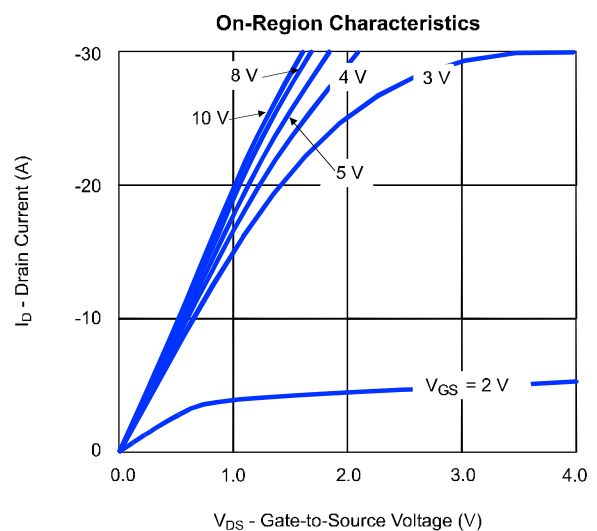
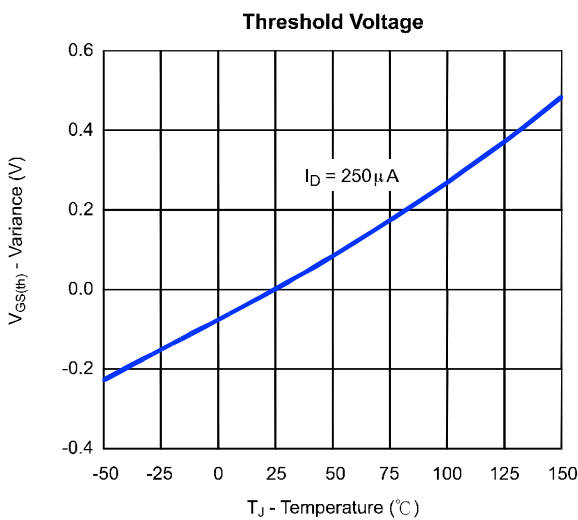
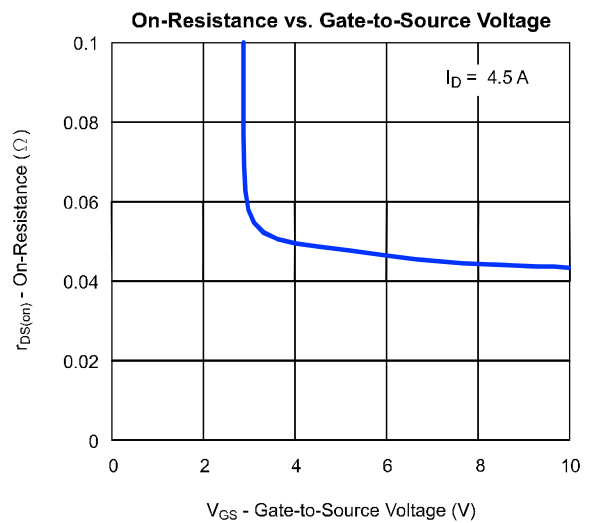
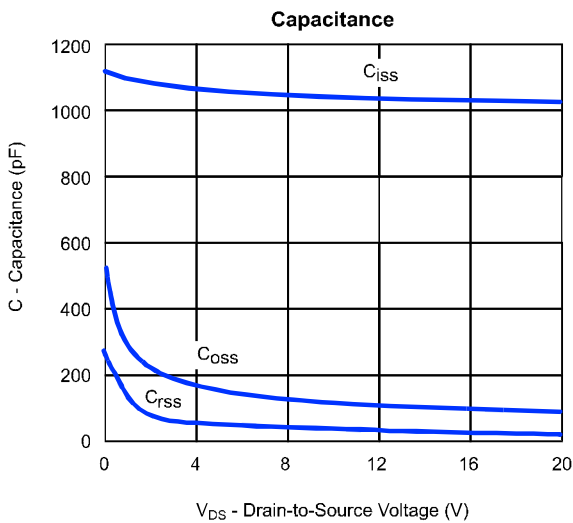
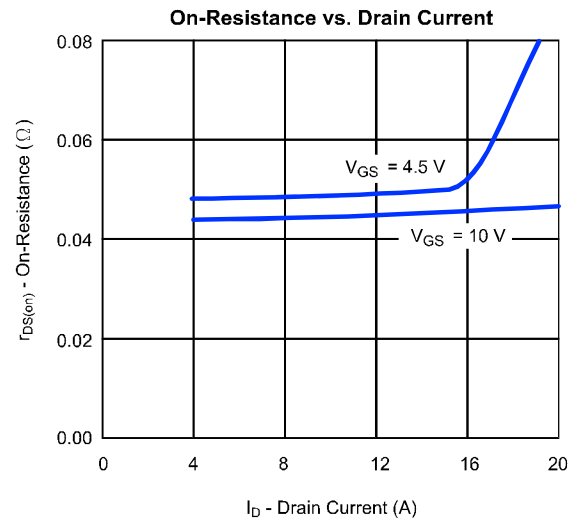
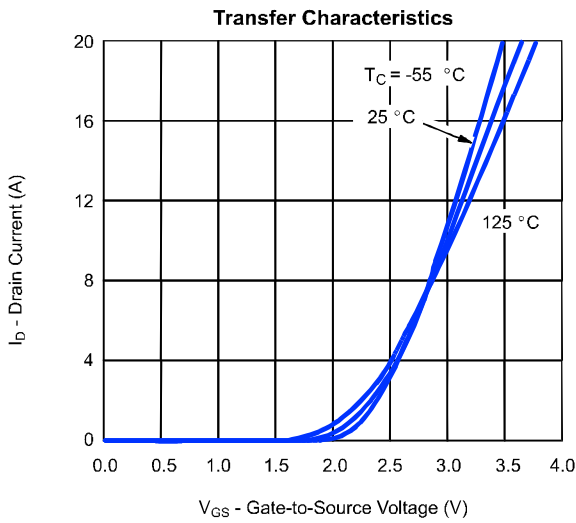
Typical Characteristics (T_J = 25°C Noted)

N-CHANNEL



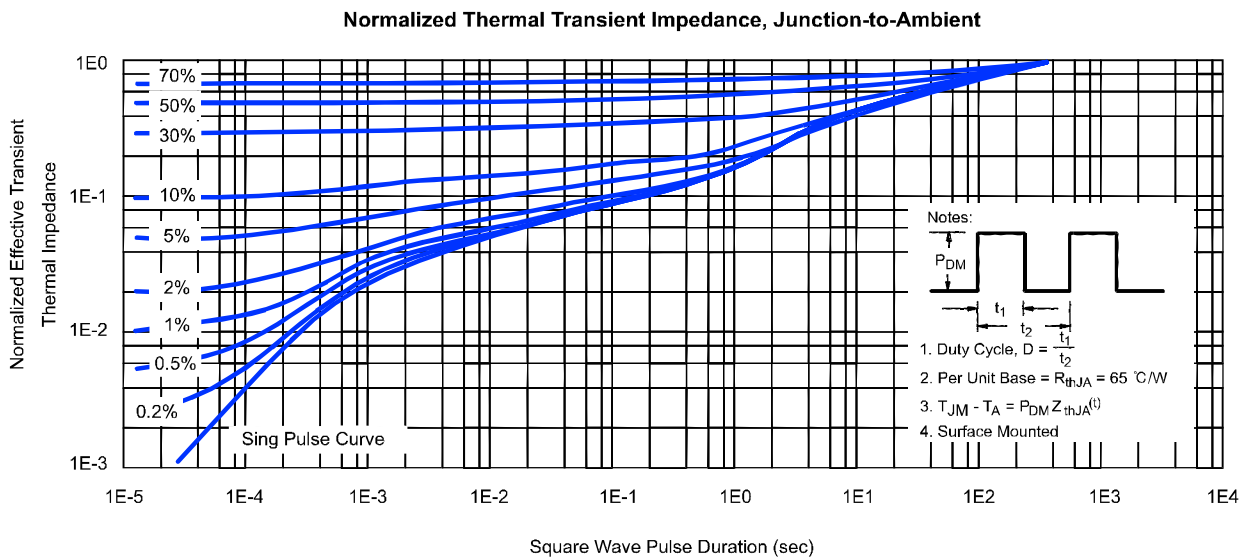
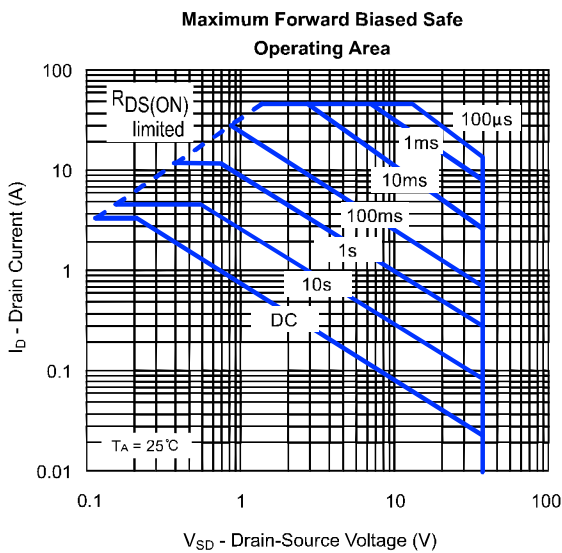
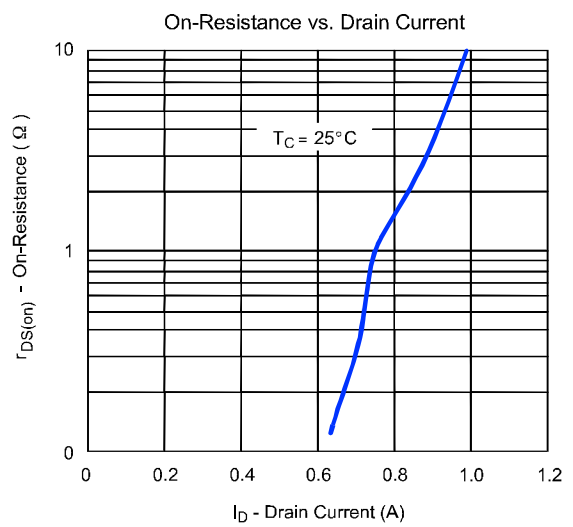
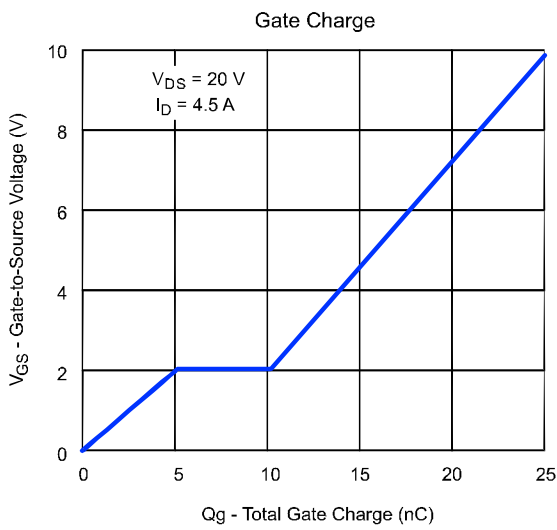
Typical Characteristics (T_J = 25°C Noted)

P-CHANNEL

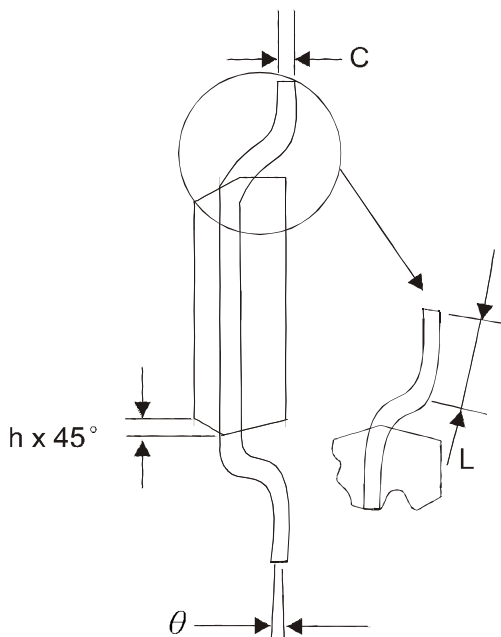
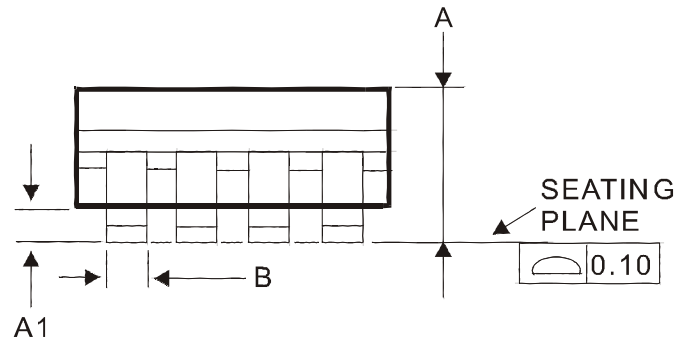
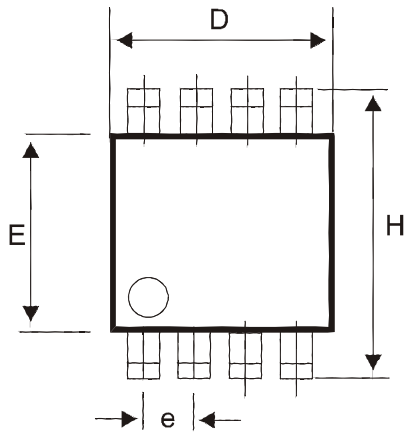


Typical Characteristics (T_J = 25°C Noted)

P-CHANNEL



SOP-8 Package Outline



DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

Note: 1. Refer to JEDEC MS-012AA.

2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15 mm per side.

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