

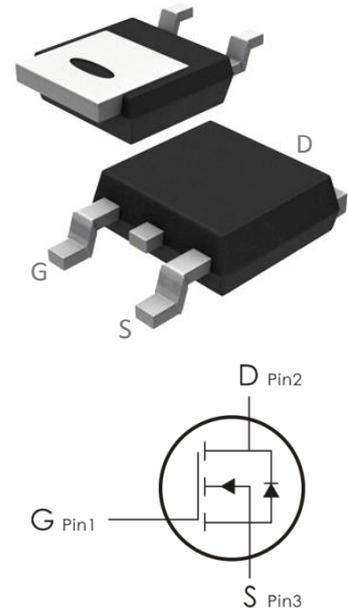
Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=60V, I_D=20A, R_{DS(ON)} < 44m\ \Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	20	A
	Continuous Drain Current- $T_C=100^\circ C$	14	
	Pulsed Drain Current	60	
E_{AS}	Single Pulse Avalanche Energy ⁵	72	mJ
P_D	Power Dissipation	40	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ²	3.7	$^\circ C/W$

Package Marking and Ordering Information:

Part NO.	Marking	Package
DE045NG-L	E045N-L	TO-252

Electrical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=60V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics³						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	0.7	1.0	1.3	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=4.5V, I_D=20A$	---	37	45	m Ω
G_{FS}	Forward Transconductance	$V_{DS}=5V, I_D=4.5A$	11	---	---	S
Dynamic Characteristics⁴						
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	---	500	---	pF
C_{oss}	Output Capacitance		---	60	---	
C_{rss}	Reverse Transfer Capacitance		---	25	---	
Switching Characteristics⁴						
$t_d(on)$	Turn-On Delay Time	$V_{DD}=30V, I_D=2A, R_L=6.7\Omega$ $V_{GS}=10V, R_G=3\Omega$	---	5	---	ns
t_r	Rise Time		---	2.6	---	ns
$t_d(off)$	Turn-Off Delay Time		---	16.1	---	ns
t_f	Fall Time		---	2.3	---	ns
Q_g	Total Gate Charge	$V_{GS}=30V, V_{DS}=10V,$ $I_D=4.5A$	---	14	---	nC
Q_{gs}	Gate-Source Charge		---	2.9	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	5.2	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage ³	$V_{GS}=0V, I_S=20A$	---	---	1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300 \mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$.

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

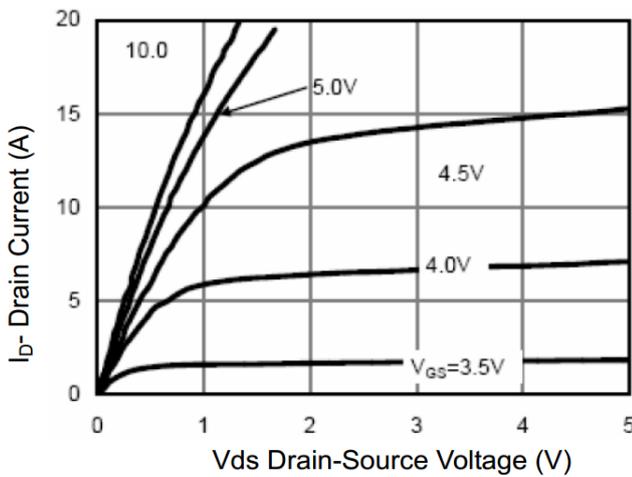


Figure 1 Output Characteristics

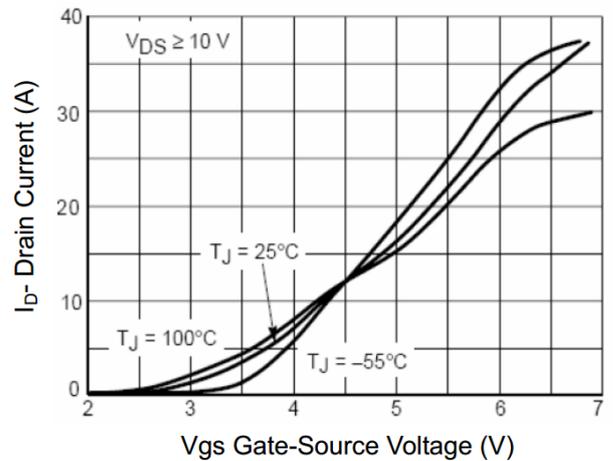


Figure 2 Transfer Characteristics

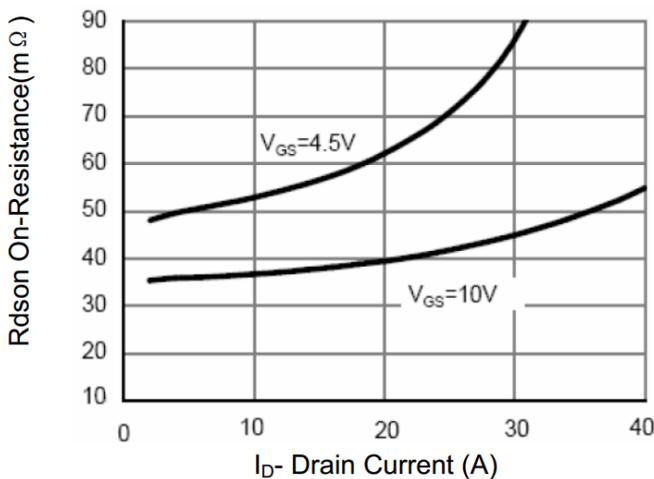


Figure 3 Rdson- Drain Current

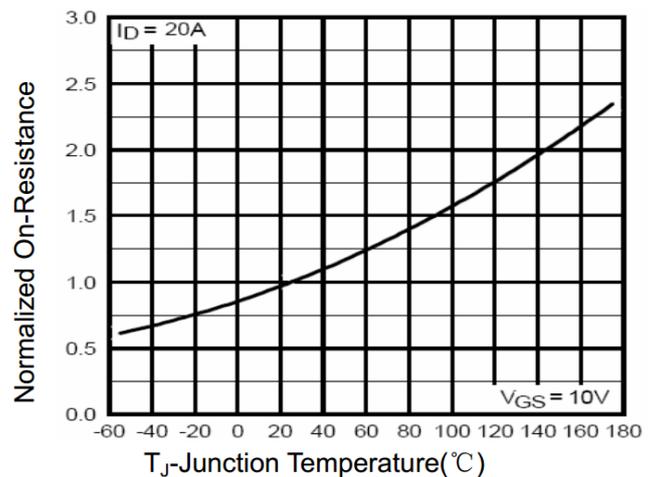


Figure 4 Rdson-Junction Temperature

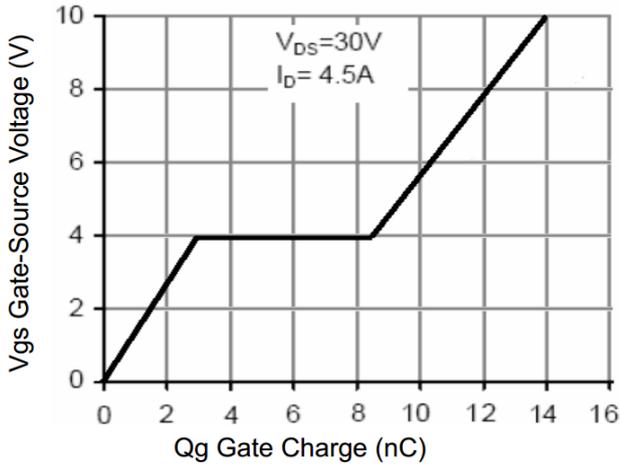


Figure 5 Gate Charge

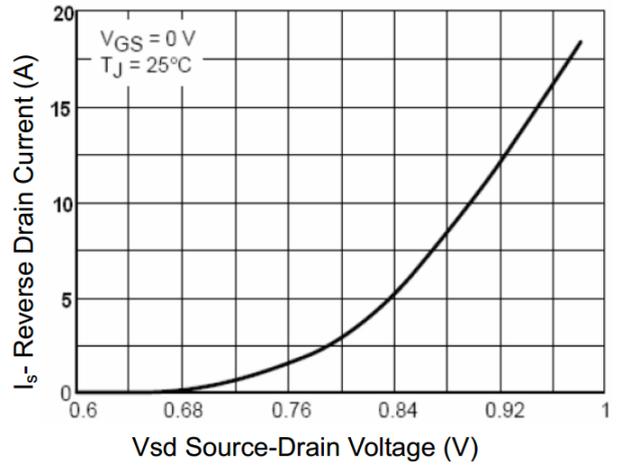


Figure 6 Source- Drain Diode Forward

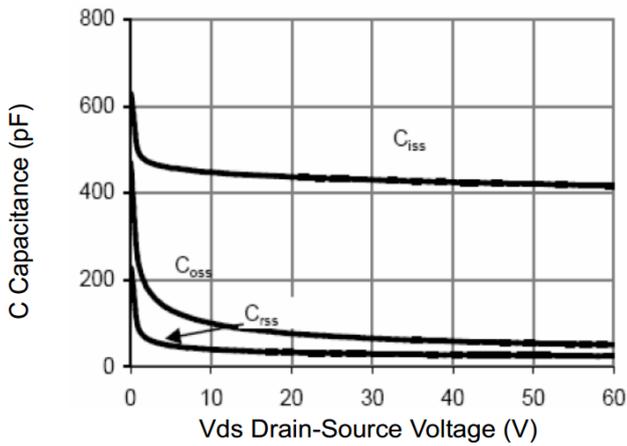


Figure 7 Capacitance vs Vds

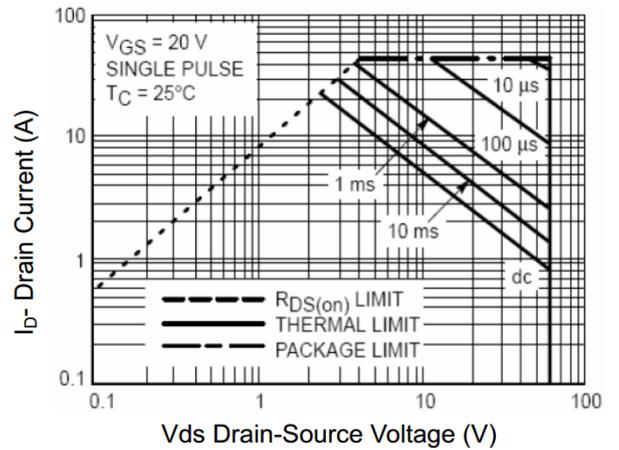


Figure 8 Safe Operation Area

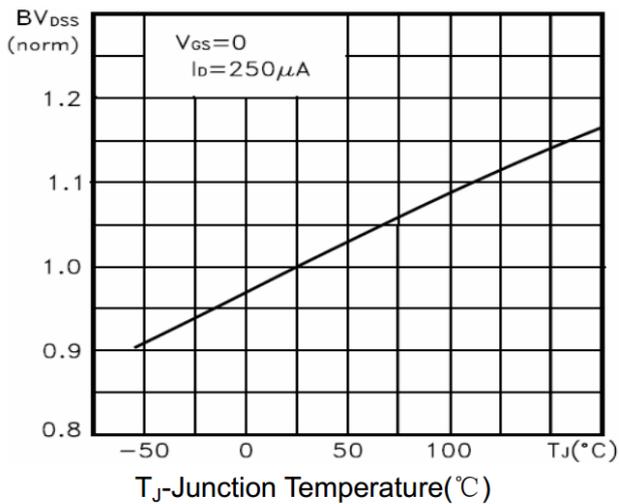


Figure 9 BV_{DSS} vs Junction Temperature

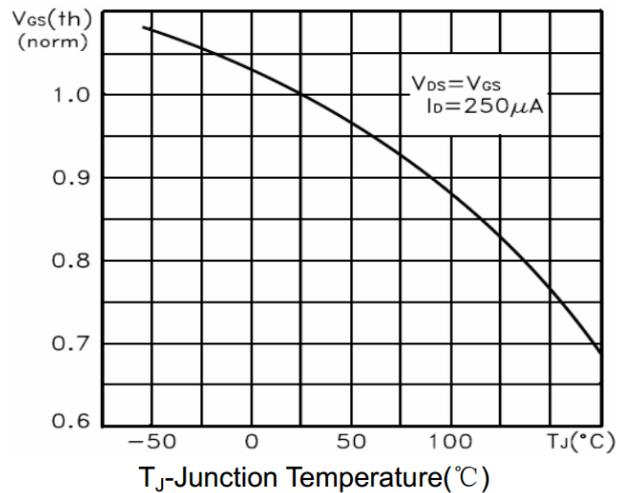


Figure 10 V_{GS(th)} vs Junction Temperature

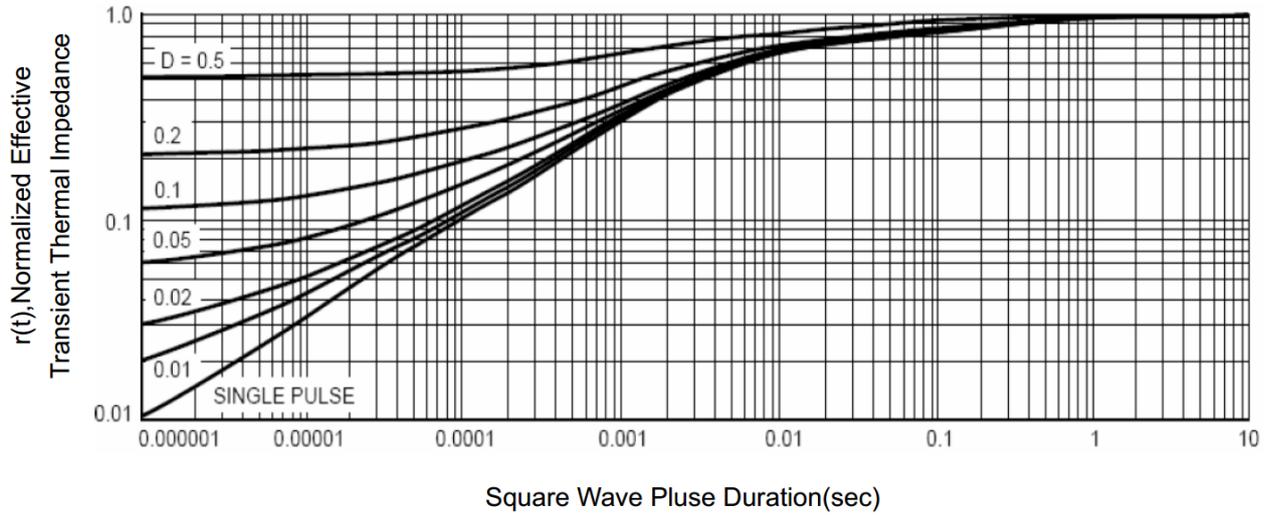


Figure 11 Normalized Maximum Transient Thermal Impedance